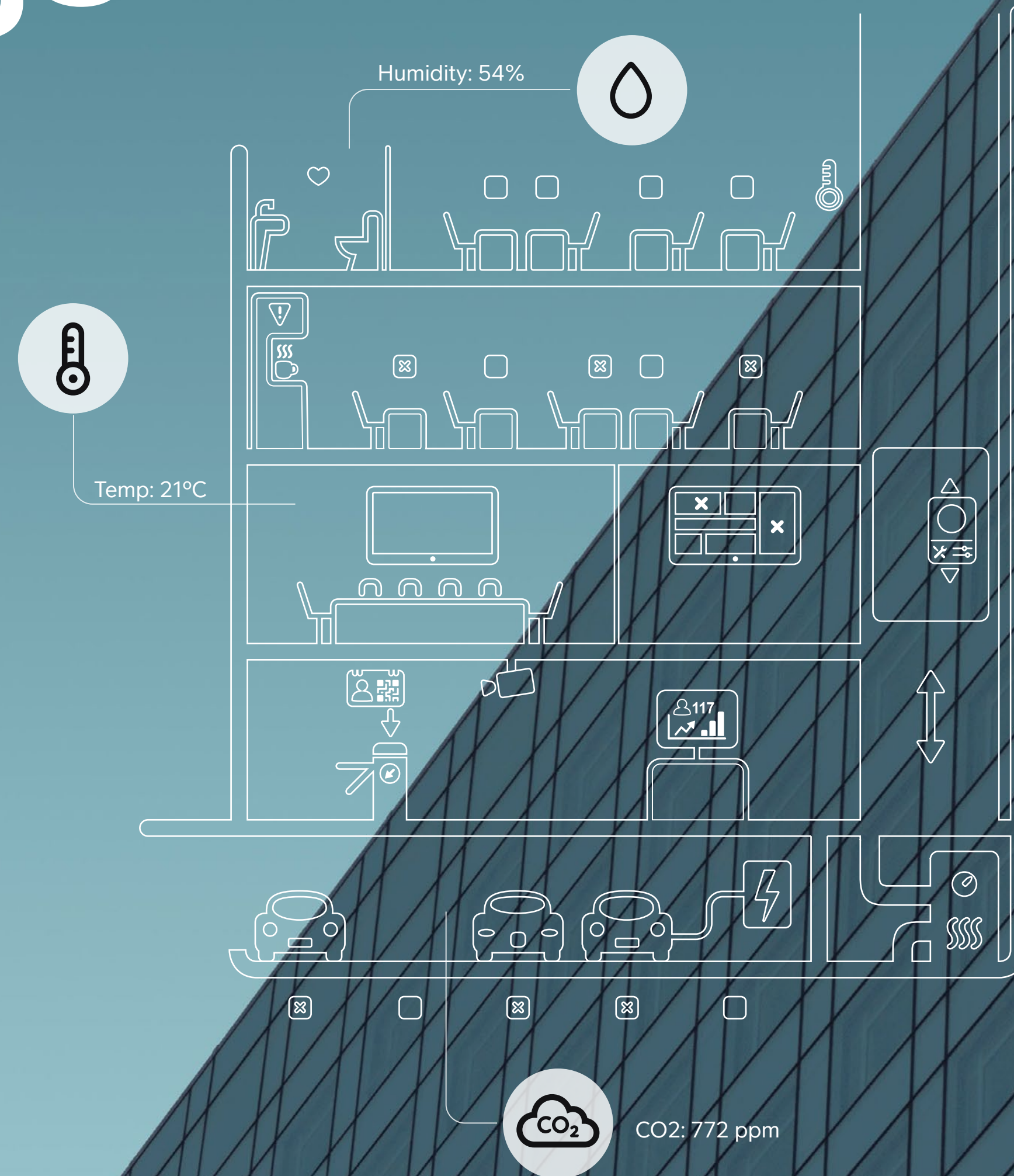


# Smart buildings buyer's guide

How to unlock new value from buildings with digitalization, IoT and data insights.



# How you can make your building smarter

Smart buildings can increase tenant satisfaction, sustainability and profit margin. So, where do you begin? Well, the chances are you already have. A smart building combines existing data from your building with new data sources to unlock savings and value.

This buyer's guide will help you to identify what that value can mean for you and what it will take to achieve it – and help you get started.

**We have divided this guide into three chapters:**

**Why?** Which use cases deliver the most value – and which deliver it fastest.

**What?** What you need to have in place. We look at it from a functional perspective rather than getting too technical.

**How?** How do you bring it all together and make things start to happen.

## PART 1:

# Why?

The value of a smart building

4. Start with the value
5. Efficiency & sustainability
6. Tenant experience
7. Building insight
8. Energy optimization
9. Air Quality Management
10. Locks & Alarms

## PART 2:

# What?

The foundations of a Smart building

14. A platform to build on
15. Inputs – sensor and sensibilities
16. Process – making sense of it all
17. Output – the world at your fingertips
18. The right data
19. Digital Twin – beyond the hype
20. Own your data
21. Data privacy
22. Location Insight – Crowd movement data
23. Connecting your building
24. Network & cyber security

## PART 3:

# How?

Put your plans into action

26. Before you look at technology
27. Bear this in mind before you start
28. Assemble your dream team
29. Think big. Start small.
30. Checklist – Get started
31. This is Telia Smart Building

# What does 'smart' actually mean?

Before we dive in, let's define some terms...

**Digitalization** has many definitions in different contexts. At its most simple, it is: *the collection and use of data to optimize, understand and automate processes and decisions.*

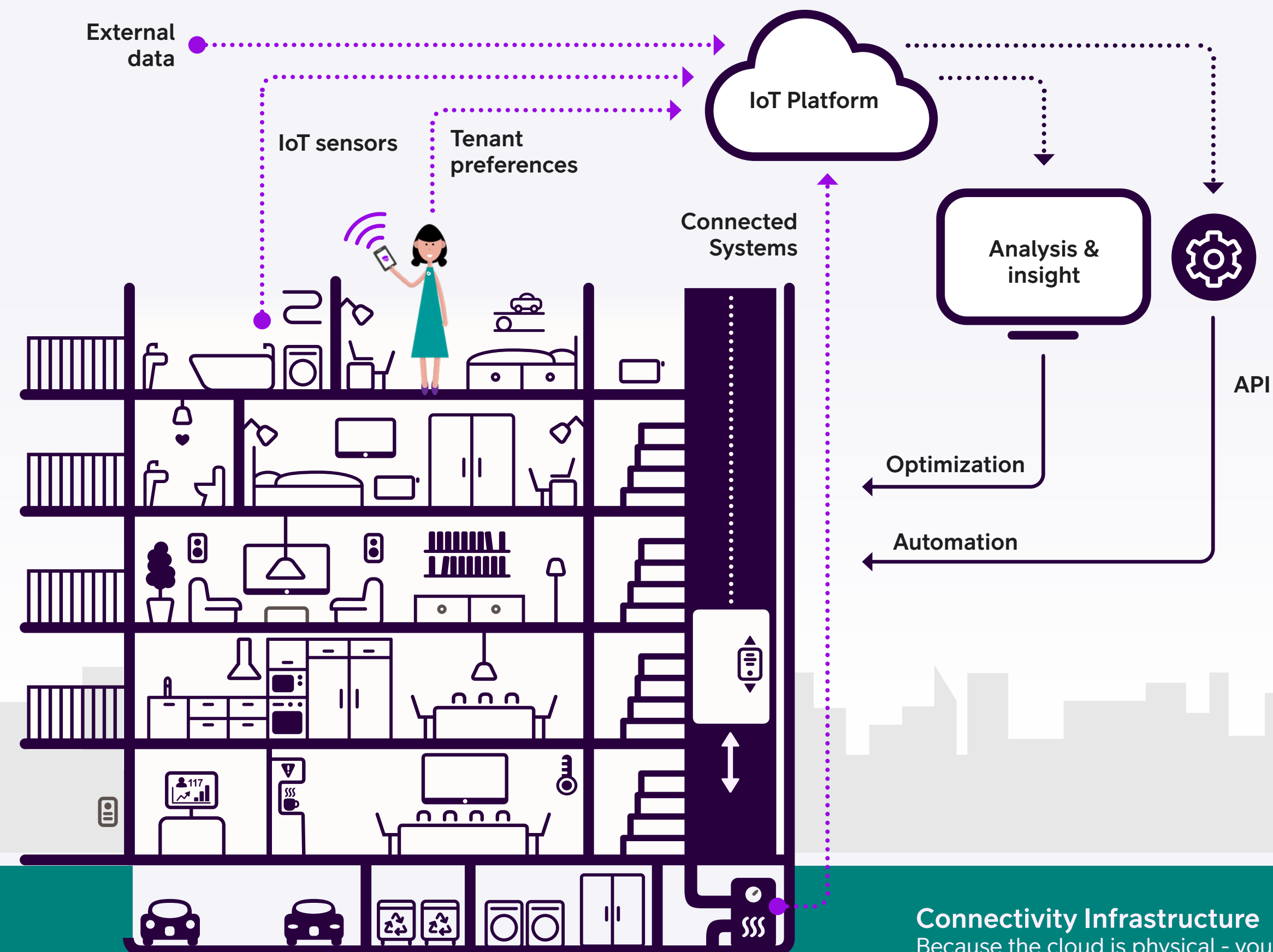
**Smart Buildings** combine data from multiple sources to enable monitoring, optimization and automation. It also generates insights that enable new services and value opportunities.

## IoT (Internet of things)

This is the 'real world' part of digitalization. It uses physical sensors and other sources of building data and connects them to an IoT platform so they can be monitored, analyzed and optimized.

**Building Data:** anything that generates data and can be connected can feed into a smart building solution.

- **Sensors:** collect data from inside and outside the building.
- **IoT enabled BMS:** data from systems such as heating, ventilation, lighting and security.
- **Tenant Preferences:** current & historical data on what tenants want: e.g. preferred room temperature.
- **External Data:** weather conditions and predictions, location insights, historical data sets etc.



**The Cloud** refers to the data centers around the world where different software applications are hosted – and the physical networks that connect to them.

**IoT Platform** is a digital application for collecting, visualizing and analyzing data from your building so you can gain insight and start optimizing.

**Location Insights** use data with a location element (WiFi or mobile network) to show the volume and movement patterns of people inside and outside the building.

## Connectivity Infrastructure

Because the cloud is physical - your applications can only be as good as the infrastructure that connects them. The main infrastructure that connects buildings to the Internet today is optical fiber. Cellphone towers connect directly to this fiber to connect mobile devices as efficiently as possible.

# Part 1: why?

## The value of a smart building

A common mistake is to start building a technical solution and then trying to find a problem it can solve. Instead, you should start by clearly defining what you want to achieve. Until you've done that, don't even start looking at the technology. Here we identify the value of a Smart Building so you can find your "why".

### Page

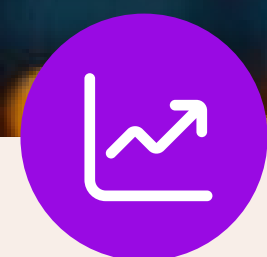
5. Start with the value
6. Efficiency & sustainability
7. Tenant experience
8. Building insight
9. Welcome to the new normal
10. Energy optimization
11. Creating a healthy and productive environment
12. Digital locks & access



# Start with the value

The starting point for any smart building initiative should be to identify the value you will gain. Otherwise, what's the point?

This value can be broadly grouped into three main areas:



## Efficiency & sustainability

With real-time visibility of what's happening in your building, you can start optimizing and do more with less.

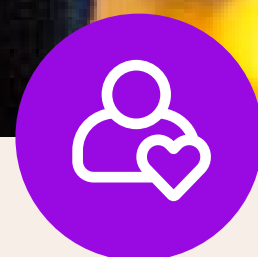
### + Increase

- Energy efficiency
- Maintenance efficiency
- Sustainability

### - Reduce

- Operational costs
- Staffing costs
- Emissions

*"I want to reduce my operational costs and increase sustainability"*



## Tenant experience

By giving your tenants a better experience, you can increase their satisfaction, and the value and duration of your leases.

### + Increase

- Comfort
- Satisfaction
- Everyday convenience
- Security
- Health & safety
- Building value

### - Reduce

- Complaints
- Unhealthy environments
- Risk

*"I want to give my tenants a better experience"*



## Building insight

When you can see how the systems in your building interact – and how they affect your tenants – you can make changes for the better.

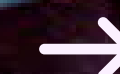
### + Increase

- Lease value
- Predictive maintenance
- Location insights
- Physical & IT security

### - Reduce

- System downtime
- Staffing costs
- Over-crowding

*"I want to identify new cost savings and revenue sources"*





# Efficiency & sustainability

Efficiency is the low-hanging fruit of digitalization. It's an area where small changes can make a big difference for our environment and your bottom line. It's also generally the area where you can get the fastest return on your investment.

### Energy efficiency

By monitoring the temperature throughout your building, you can optimize your HVAC systems to avoid energy wastage. This helps to reduce operational costs and improve sustainability.

when something needs attention, you can work more effectively, e.g. connected waste containers that alert you when they're full, can reduce staffing costs.

### Maintenance efficiency

By monitoring your building systems remotely; you can make sure they are working correctly and maximize system uptime without having to physically inspect then every time. Similarly, by monitoring

### Resource & asset efficiency

By understanding which assets are being used – such as meeting rooms or shared facilities – you can enable real-time booking systems to make the most of your assets.

## Sustainability through the entire value chain



### CONSTRUCTION

Reduce material waste  
Cleaner transport & logistics



### OPERATION

Reduce energy wastage  
Identify inefficiencies



### TENANTS

Reduce energy consumption  
Cleaner waste management



Temperature monitoring .....



HVAC monitoring .....



Fault detection .....



Meeting room availability .....



Waste monitoring .....



Water usage monitoring .....



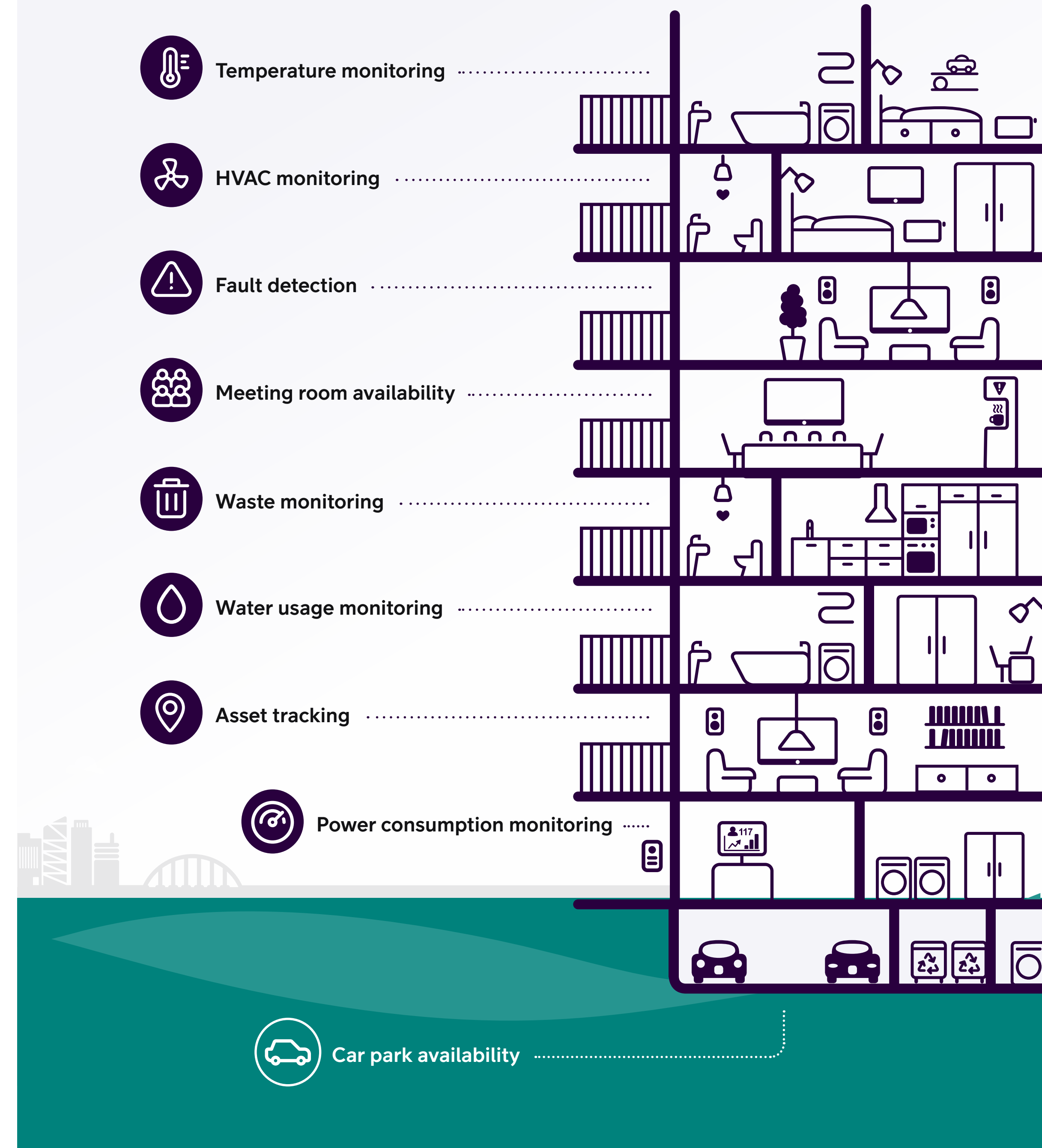
Asset tracking .....











Power consumption monitoring .....



Car park availability .....





- .....  Air quality monitoring
- .....  Smart locks
- .....  Temperature monitoring
- .....  Smoke detectors
- .....  Waste monitoring
- .....  Leakage detectors
- .....  Smart appliances
- .....  TV Broadband & phone



## Tenant experience

Your tenants matter most. By giving them a better experience, you can increase customer satisfaction and raise the value of what you offer.

### Comfort

Temperature monitoring lets you finetune and automate your HVAC systems to maintain an even and comfortable temperature that matches your tenants' preferences.

### Convenience

From meeting rooms to laundry rooms and car parks to bicycles: when tenants can see when shared assets are available, they can make the most of them. "Smart home" capabilities can also let tenants control lights and appliances in their apartments via an app on their phones. Keyless locks let tenants unlock and lock remotely for deliveries – and mean they can never forget their keys.

### Communication

If your tenants experience a problem, they should be able to tell you instantly through their choice of digital communication channel. It also allows building managers to create a closer relationship with their customers.

### Health & Safety

Monitoring air-quality can help you keep your tenants comfortable while avoiding air contamination or unhealthy environments.

## There's an app for that

Digital apps can provide new value-added services for tenants and a direct communication loop between them and building management. This enhances the tenant experience and enables them to easily report problems and allows building managers to react quickly and inform them about important matters.

Connecting devices and data sources takes this feedback loop a step further. It means building managers can be alerted and respond to potential problems before tenants even notice them.





# Building insight

When you understand how your building works – and when it doesn't – you can start to unlock new value. This can be anything from gaining a more granular understanding of your customers' needs to modeling new scenarios for your building's systems.

### Predictive maintenance

Being able to measure how many times something is used, e.g. how many times an elevator door opens or how many hours a heating system has operated since its last service – you can predict the optimal time to take action. This reduces unanticipated downtime as well as the avoidable service costs of being "too cautious".

### Location insights

Understanding how many people visit the area around your building at different times, can help

you quantify its value to retailers. This is valuable in lease negotiations and understanding which types of services to provide. Measuring how many people are inside a building is a valuable capability as we return from the COVID pandemic.








### Lease Value

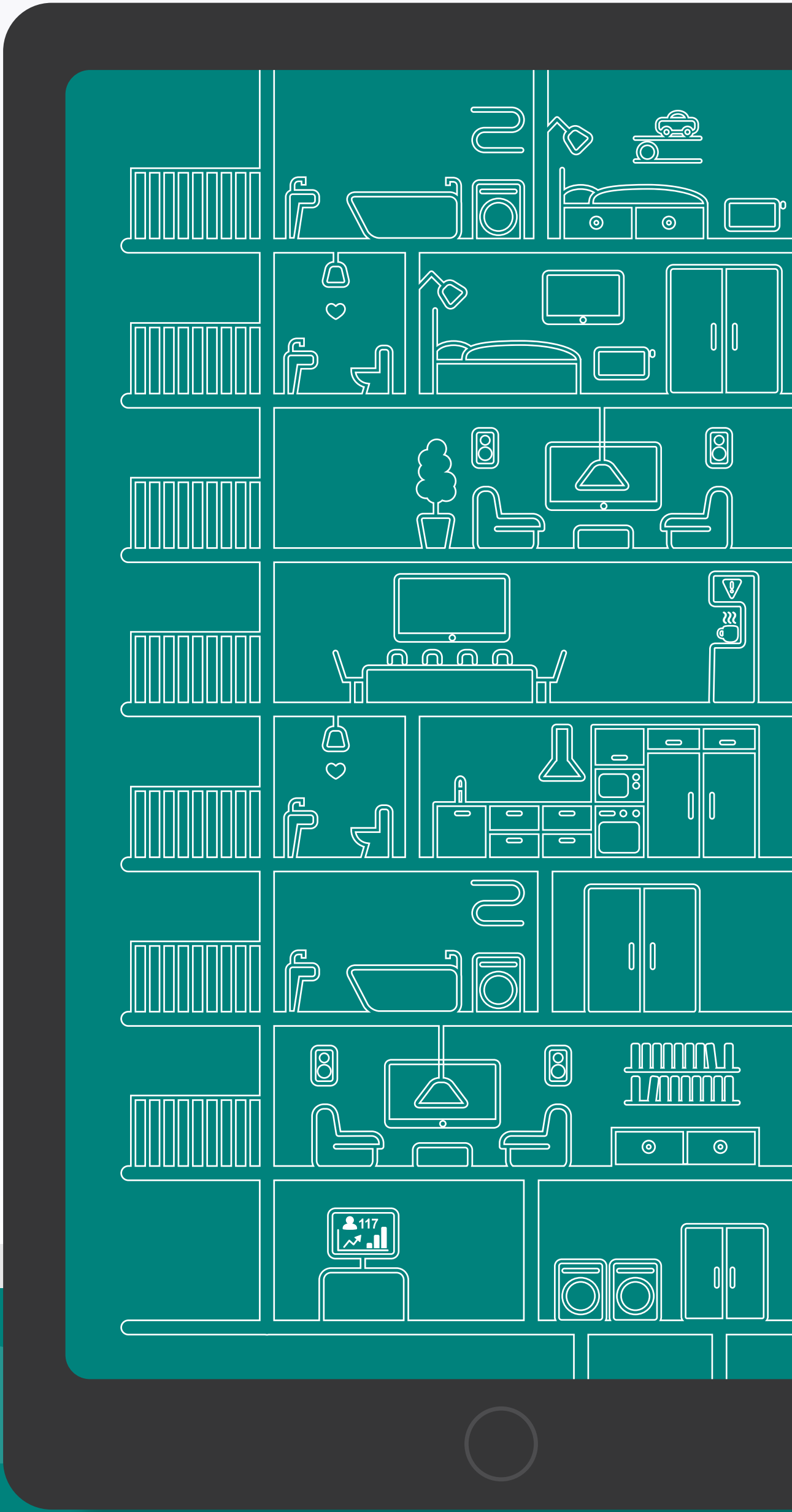
By understanding what your tenants want – and giving it to them – you can increase the return on your building. This is particularly true for commercial premises, where customers can have very high technology and connectivity requirements.



## What gets measured, gets done

By clearly defining and measuring KPIs for service providers, you gain a clear and fair way of assessing performance. You can also give service providers tools that help them work more effectively, such as digital service maps and activity monitors that tell them which rooms have been used the most and may require extra cleaning.

-  Security & Access .....
-  System monitoring .....
-  Location Insights .....
-  Predictive maintenance ....
-  Service & KPI monitoring ...
-  Elevator monitoring & Communication .....
-  Digital twin .....





# Welcome to the new normal

The full impact of COVID-19 on commercial real estate remains to be seen. But early signs suggest that the role of commercial buildings is about to evolve.

With the forced 'work-from-home' experiment proving a relative success, it is likely that many people will choose to split their activities between collaborative work at the office and focused work at home. This will have implications for both commercial and residential buildings and will hold new challenges and opportunities.

In our recent report: Digitalization of Buildings in the Nordics & Baltics, three opportunities were identified as being of immediate interest to building managers:



**Energy optimization**



**Security & Access**



**Air quality monitoring**

We explore each of these in more detail in the following sections.



# Energy optimization

## Doing more with less

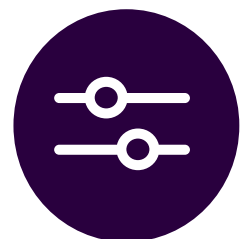
Efficiency and sustainability are two sides of the same coin. Reducing energy consumption also reduces the emissions generated to provide it. The fact that this also reduces operational costs essentially makes it a no-brainer. When good-for-environment means good-for-business – change can happen quickly.

As more building managers and their tenants become aware of the energy saving opportunity smart buildings offer; expectations and commitments are increasing. Many building operators have set the target of becoming climate neutral in their entire value chain. Energy optimization will be a key enabler of this.

The starting point is to collect temperature measurements from each part of your building. By also connecting your heating, cooling, ventilation and air-conditioning systems to the same interface, you can fine-tune temperature and comfort levels directly.

At a more advanced level, this information can be combined with current and predicted weather conditions to provide adaptive heating that anticipates future needs with pre-heating or passive cooling to stay one step ahead of your tenants' needs. This also helps to minimize wastage.

The circle can then be completed by using all of this information to automate your HVAC systems using an API. That way, you can be actively reducing energy wastage 24/7 and 365 days a year






An upgrade to a single component or isolated system in a building can result in energy savings of 5 – 15%. Integrating systems can increase this to 30% or more depending on the building and its condition.



# Creating a healthy and productive environment

As people have started returning to commercial buildings, there has been an increased focus on healthy and well-ventilated work spaces. In a number of countries, air quality standards are being discussed that increase the demands on ventilation systems. They will also require real-time monitoring of air quality and Volatile Organic Compound (VOC) levels.

Even before the pandemic there was increasing awareness of the importance of indoor air quality for comfort and productivity. The three components of good air quality are:

-  **Temperature** – not too hot or cold
-  **Humidity** – not too dry or too sticky
-  **Ventilation** – maintain air movement and exchange



The Indoor Air Quality Index is based on the the combined data obtained from simultaneous measurements of indoor climate data. For example volatile organic compounds (VOC), temperature, humidity, CO2 and air pressure.

A wide range of sensors are already available that can measure these variables. Those that use wireless connectivity can easily be retro-fitted to existing buildings at minimal expense. The important consideration here is not to rush in and establish a standalone solution that becomes an information silo; but to take a broader view and see how you can incorporate this data in other use cases in your building.



## Standards create standards

**Air Quality Indexing (AQI)** provides a 'scorecard' for each building – and these scorecards are becoming increasingly important. As more and more people start to have smart thermostats that display air quality, they start to become aware of the AQI and how it affects them. Already, in China, companies are starting to include the AQI of their building in job ads – to show they provide a healthy work environment.

Increasing awareness of AQI is likely to create a de-facto standard – and one that many governments may eventually start to regulate. Thanks to retrofitting, it is relatively simple to add this functionality to existing buildings. As well as providing an index of current air quality levels, these can also send out alerts if dangerous levels occur.

# Value that goes both ways

Smart buildings offer a classic win-win. Tenants can access digital services relevant to them via an app on their phone and building managers can receive information that is relevant to them via their cloud platform. With any service where data is shared, privacy considerations should be in focus from the start. Read more about privacy on page 21.



From a security perspective, smart locks and access systems can enable the tracking of entries and exits as well as providing alerts in the case of attempted break-ins.

## For Tenants

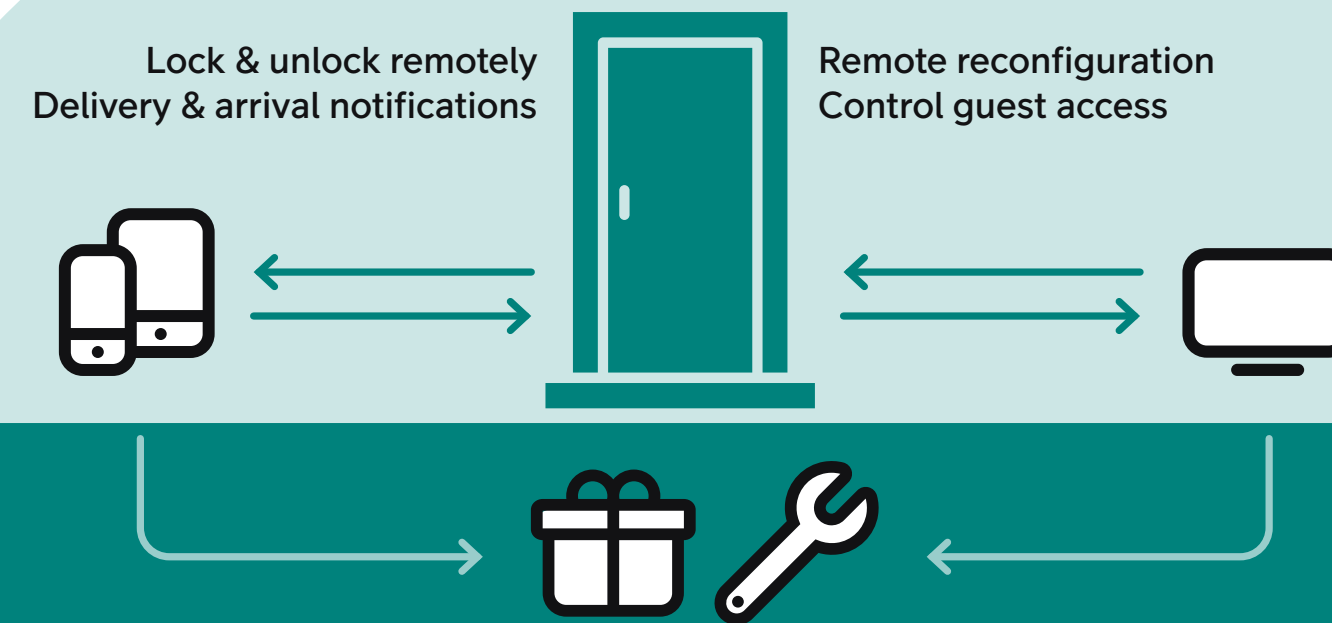
For many people, the COVID-19 pandemic has normalized online shopping and resulted in a lot more home deliveries. But for people living in apartments, receiving these deliveries can present a problem.

Smart locks provide the answer. Via an app in their phone, tenants can remotely grant temporary access to deliveries by generating a one-off access code.

Smart locks and apps can also provide 'home-safe' notifications of when family members arrive home, providing peace-of-mind for parents whose children get home before they do.

Smart alarms provide an added level of security. In addition to an audible alarm, they can send an alert to the tenant's app. This applies to security, but also to other alarms such as the presence of smoke or a water leakage. They can be set to send alerts directly to the building manager or emergency services as well.

## Locks and access



## For Facility Managers

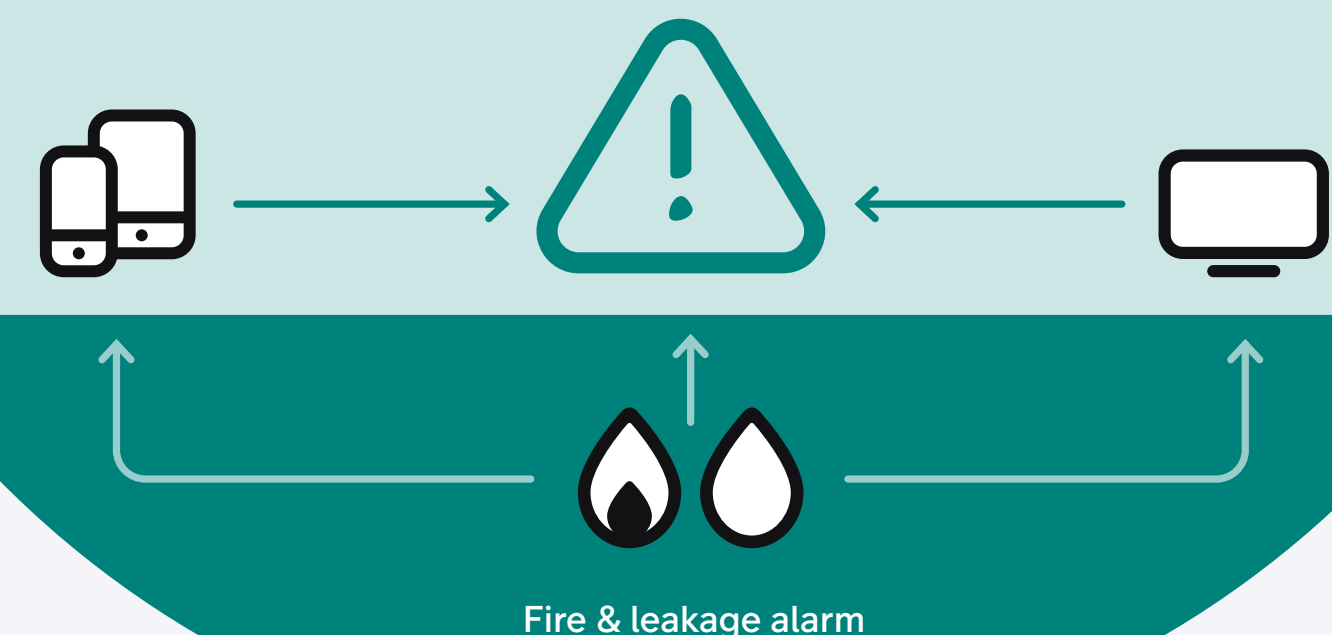
The only people smart locks might be bad news for are locksmiths. A change of tenants no longer entails changing the physical locks. Facility managers can simply reset the master access codes and pass them on to the new tenants.

This is a good example of how tenants and facility managers can gain different value from the same use case.

Smart locks also enable facility managers to allow temporary access to maintenance personnel and tradespeople without having to travel to the premises to physically let them in.

From a security perspective, smart locks and access systems can enable the tracking of entries and exits as well as providing alerts in the case of attempted break-ins. Connected alarms also enable quick action in the case of a security, fire or water leakage that can prevent significant damage to a building.

## Alarms & alerts



# Part 2: what?

## The foundations of a smart building

Once you know your “why” you can start looking at “what” it will take to achieve it. This means understanding which digitalization tools can help you. It also means considering things like network security and data privacy – before you begin

### Page

- 14. A platform to build on
- 15. Input – sensor and sensibilities
- 16. Process – making sense of it all
- 17. Output – the world at your fingertips
- 18. The right data
- 19. Digital Twin – beyond the hype
- 20. Own your data
- 21. Data privacy
- 22. Location Insight – Crowd movement data
- 23. Connecting your building
- 24. Network & cyber security





# A platform to build on

The brain of a smart building is the IoT platform that collects the data and turns it into information you can do something with. Essentially, there are three phases between data and value.

1. Input – sensors & sensibilities
2. process – making sense of it all
3. Outputs – your world at your fingertips

# 1. Inputs

## Sensors & sensibilities

Anything that can be measured and connected can be an input for a smart building

Data is most valuable when it can be combined and compared to other relevant data. The data input for your smart building can come from your existing building systems, installed sensors as well as third party data. This can include:

### Outputs from your existing systems

- HVAC
- Lighting
- Alarms
- Booking calendars

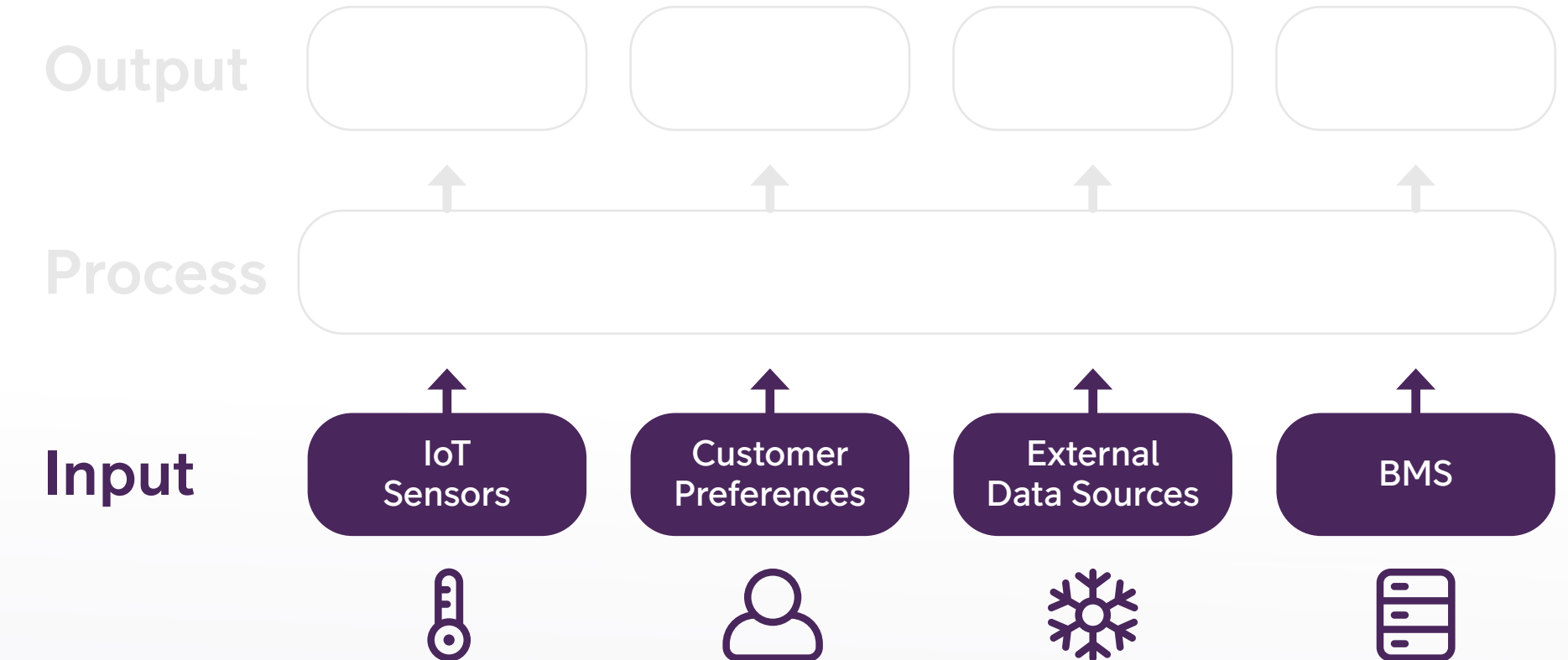
### External data sources

- Weather conditions and forecasts
- Crowd measurements
- KPIs
- Variable resource cost reports

### IoT devices containing sensors for measuring different parameters inside your building

- Temperature
- Air Quality
- Humidity
- Luminosity
- Movement

Different IoT devices have different capability levels depending on what they need to do. For some, it's enough to send a message to say if something is turned on or off. Or if a car park is occupied. Or to send a temperature measurement once an hour. Other devices may do a lot of onboard processing before sending data on to the IoT platform. It's important to right-size the sensors and connectivity you use to avoid unnecessary cost as well as sub-optimal performance.



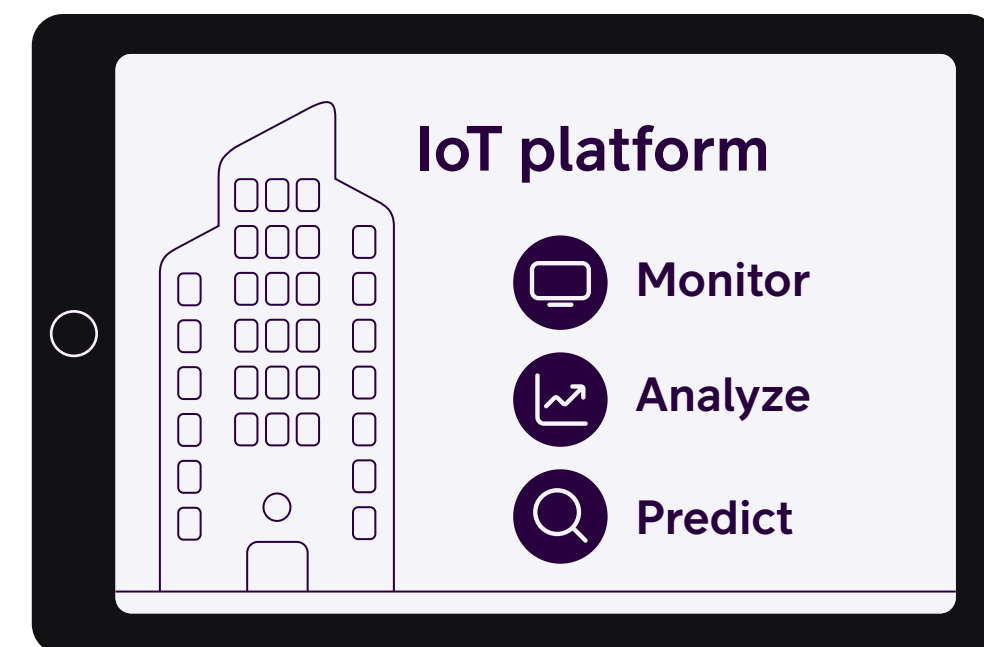
## 2. Process

### Making sense of it all

The IoT platform is both the brains and the muscle of a smart building. It is a cloud-based software platform where the data is collected and processed into meaningful information. This information can be used on three levels:

#### Monitor

This is perhaps the simplest and most powerful capability a smart building platform can deliver. When you can see what's happening in your building in real time, you can do something about it. Or better yet, let your platform do something about it by sending instructions automatically via API to control and fine-tune your building's other connected systems.



#### Analyze

The next step up is to turn data into information by putting it in context.

By combining what's happening now – with contextual data – you can gain a deeper understanding. This could be to find combination effects, such as how humidity levels affect variable ventilation usage. Or how weather conditions effect heating requirements. This is where a lot of the efficiency gains can be achieved.

#### Predict

The next level is not just to know what's happening, but to incorporate historical data in order to anticipate what's about to happen. It's the key to not just predictive maintenance, but also just-in-time maintenance so you can avoid over-servicing your systems. Different variables can be measured such as how many hours a ventilation fan has run since its last service. Or how many times a waste compactor has opened and closed.

Output



Process



Input



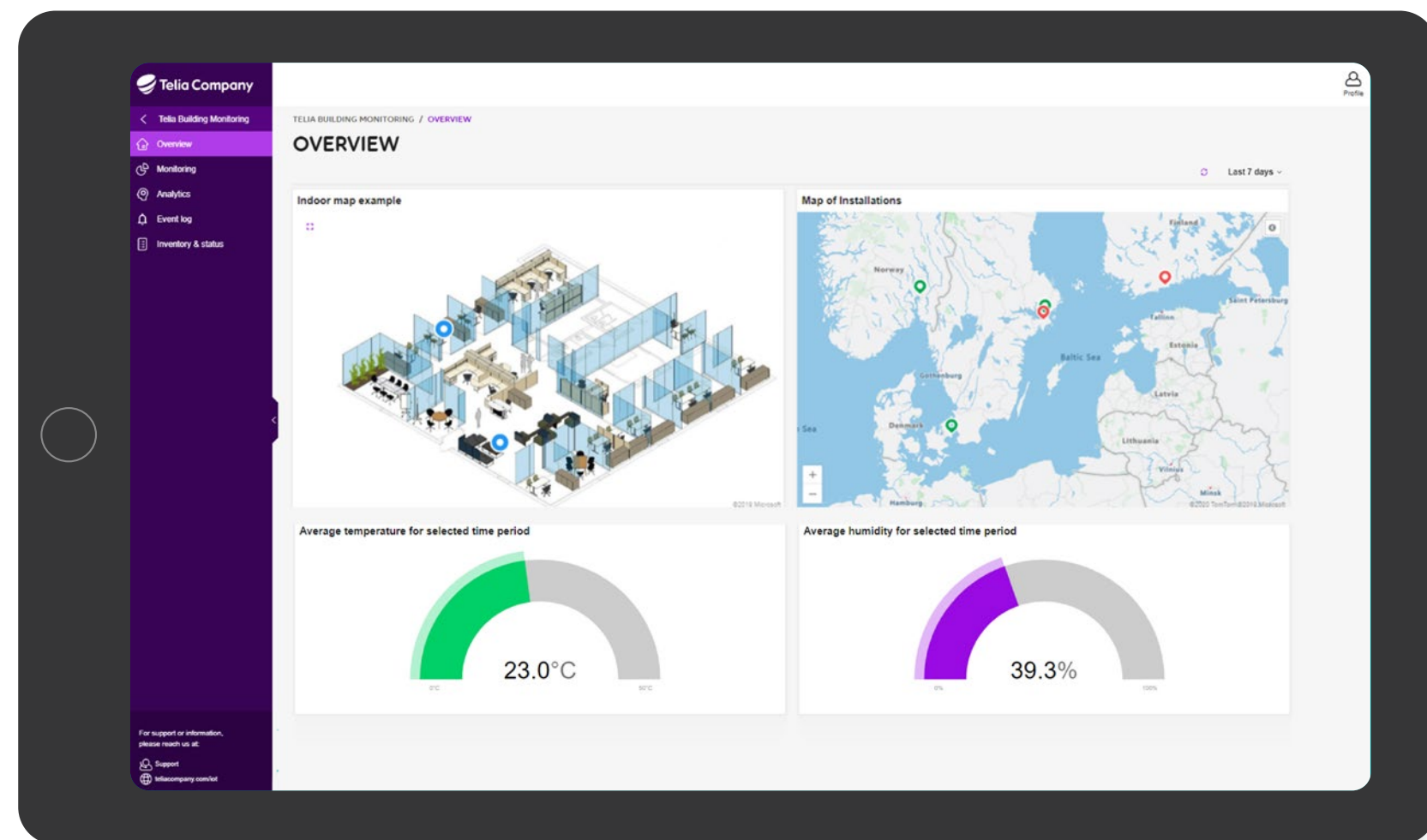


# 3. Outputs

## Your world at your fingertips

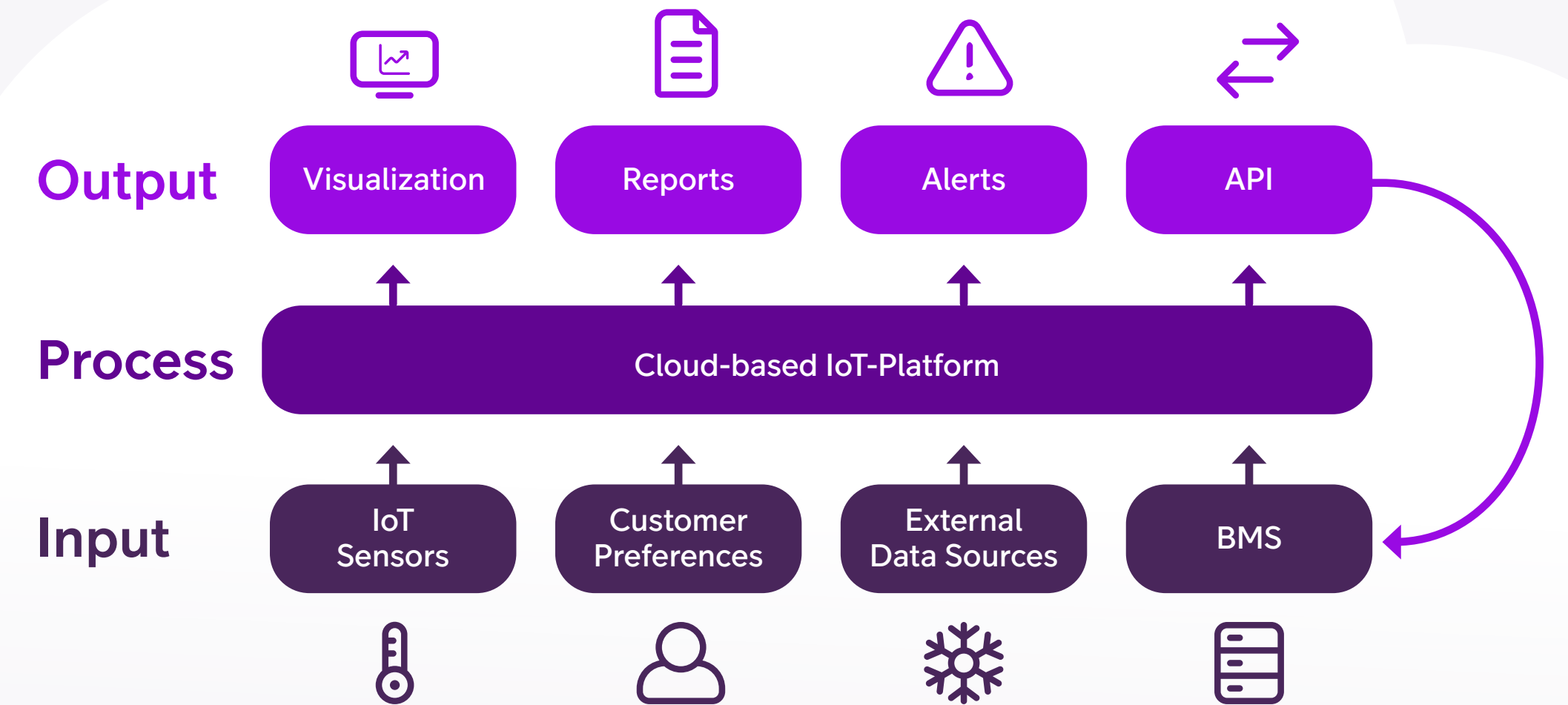
This is how you receive the data from your IoT platform so you can use it. Being able to see it clearly on your screen is an important start. A well designed user interface (UI) that gives each user just what

they need, delivers a good user experience (UX). Web based platforms let you view this on live dashboards or as digital reports.



The next level is to set up digital alerts – via SMS, email or other digital channel – if a pre-defined situation arises. This could include a system outage, temperature or air quality levels deviating from pre-defined parameters or water leakage or fire alarms.

When all of this comes together, outputs become inputs. Where data from the building is automatically fed back into building management systems via API, this is where buildings really earn the title “smart”.



# The right data for the right user all the time

When it comes to data, there is definitely the danger of: “too much of a good thing”. There is little value in giving everything to everyone and telling them to find what they need.

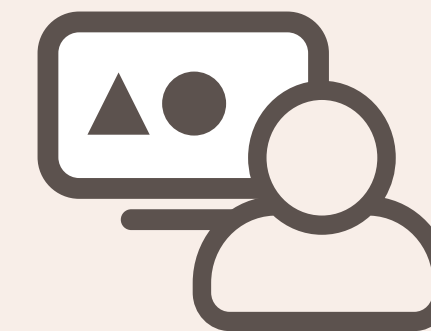
Instead you should do a thorough needs analysis and ensure your user interface is designed in a way that provides the right amount of information to the right user for the purpose they need it for. This makes it easy for people to access the information that is relevant to their daily job – without being overwhelmed.

## A single pane of glass... with many lenses

The ‘single pane of glass’ concept offers a lot of value in providing all of a building’s – or a portfolio of buildings’ – information in one consolidated dashboard. But it’s not the right thing for everyone.

Your system administrator may want everything, but maintenance only want to see which issues need attending to and cleaning staff only want to know which bins to empty. Again, putting the effort into your user interface up front is a lot more valuable and cost effective than training users to use a high-tech solution.

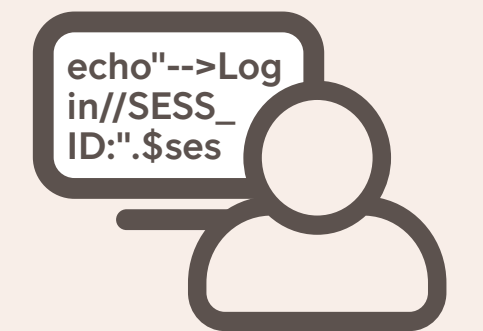
Also consider what format is appropriate for each type of user. Maintenance personnel may want simple alerts and locations whereas facility managers will want access to all data in a dashboard – and the IT department might want access to the raw data and APIs.



Alerts & maps



Detailed dashboards



Raw data & APIs

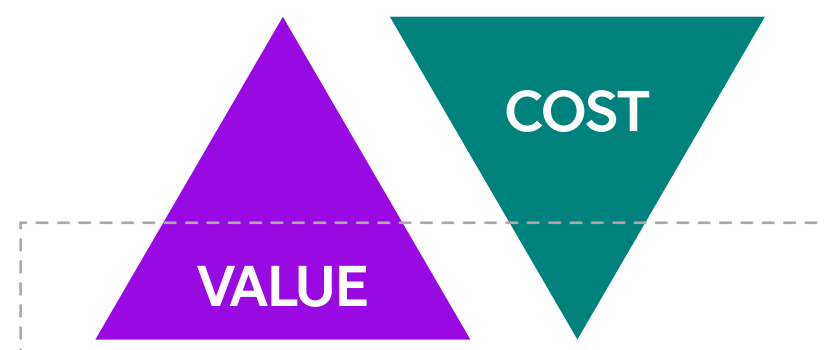
Defining different “personas” for each of the roles that will work with your data is a very effective way of understanding needs. It makes it easier to see it through their eyes, understand what’s valuable to them and make sure you’re giving it to them.



# Digital twin: beyond the hype

A digital twin is a digital representation of a real world thing – in this case a building. At its most advanced, a digital twin can be a 4D representation of every aspect of your building that you can interact with via augmented reality... or it could be a spreadsheet.

Digital twins are currently high in the hype cycle, but it's important to remember that for existing buildings, you can get the majority of the value for a fraction of the cost. If you have the dimensions and geometry of your building – and the U-values to calculate thermal properties – you can start to



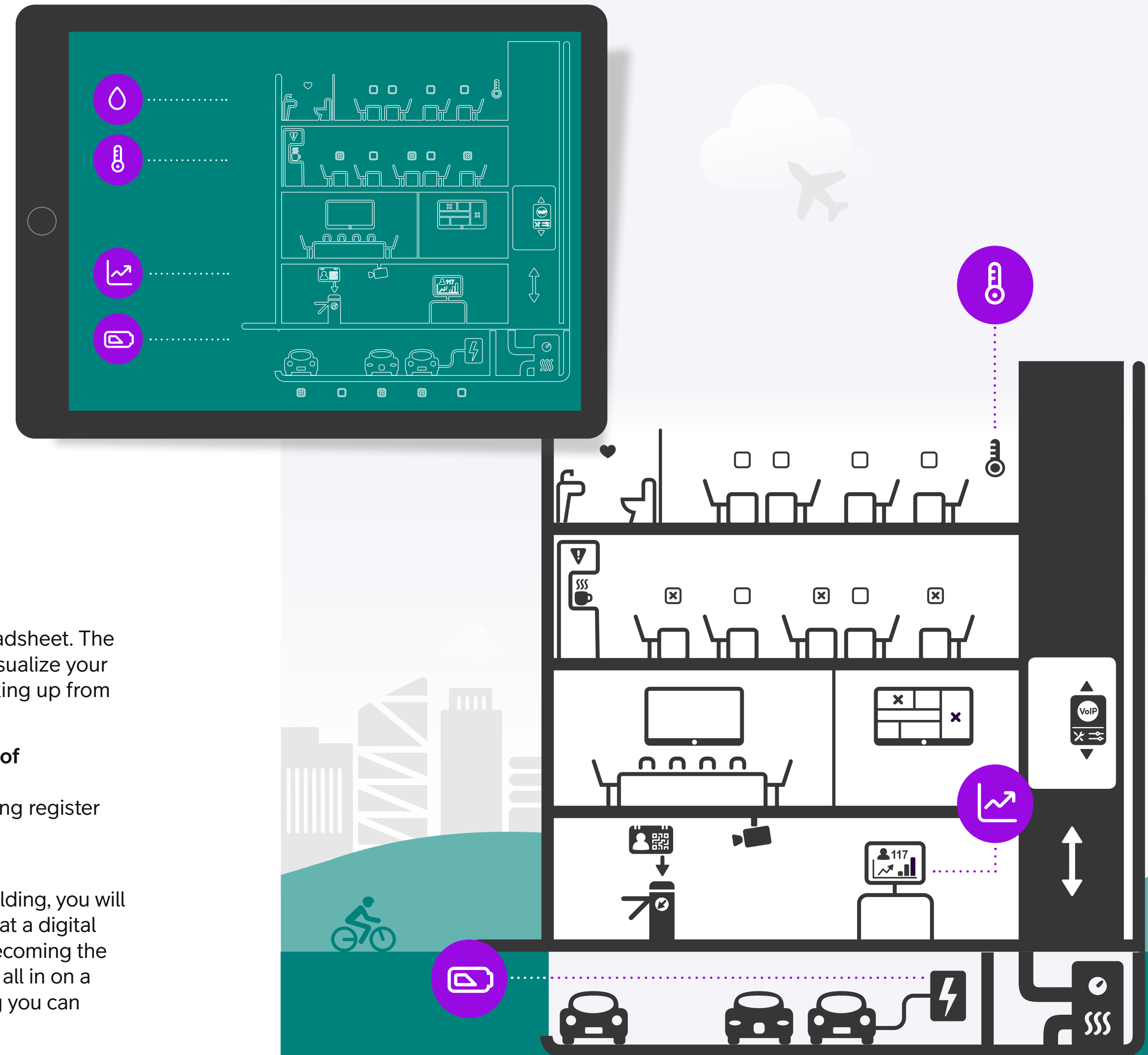
For existing buildings, you can gain most of the value of a digital twin for a fraction of the cost.

do simple scenario modelling on a spreadsheet. The next step is a platform to capture and visualize your building's data – and you can keep working up from there.

#### Simple use cases that can deliver a lot of value include:

- Keeping accurate details and a servicing register for all of your maintainable assets.
- Providing an accurate asset register.

However, if you're constructing a new building, you will most likely be putting in place a lot of what a digital twin is anyway with cloud-based BIMs becoming the norm. In that case, it may be worth going all in on a digital twin. Just make sure it's something you can maintain and build on in the future.



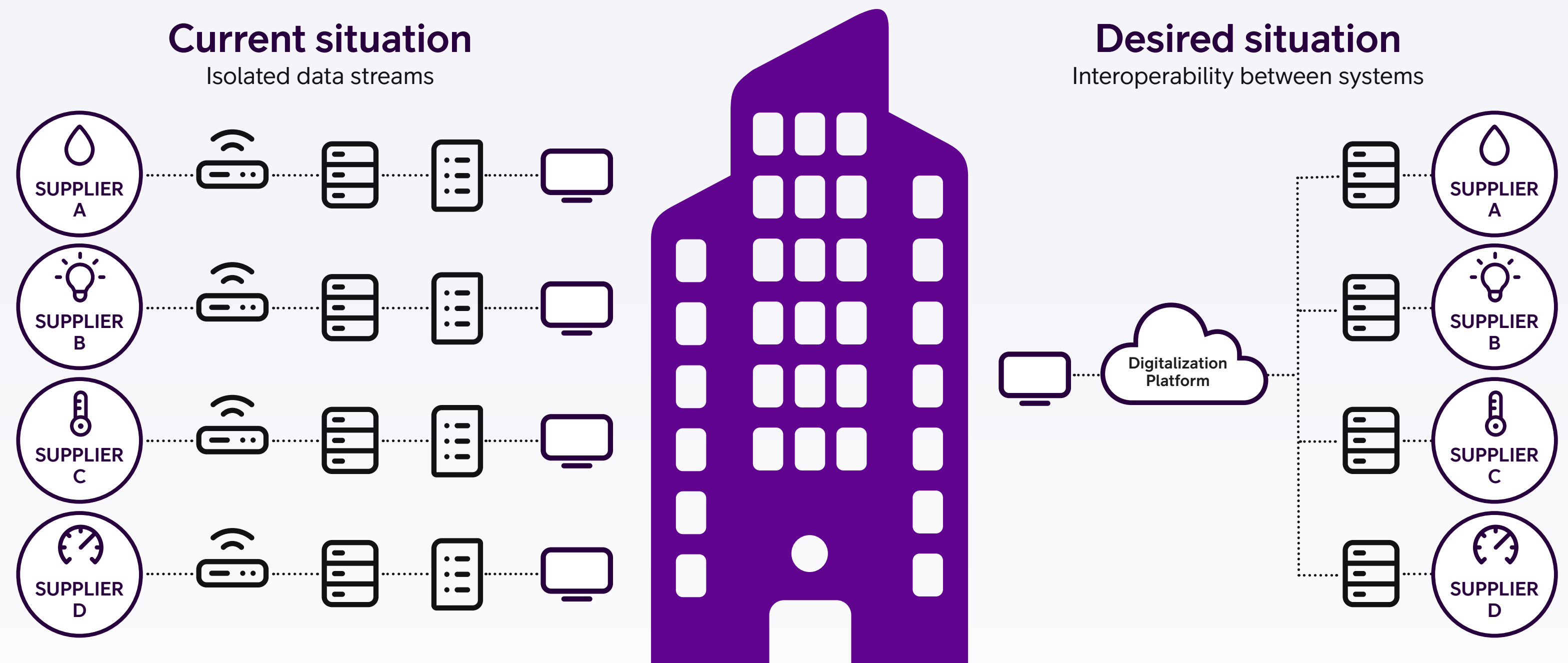
# What's yours should be yours

As the potentials of smart buildings have emerged over recent years, so has the realization that the fine-print in many contracts prevents building owners from benefiting from many of these potentials.

It comes down to data ownership and whether you in fact own the data from your solution or whether your vendors own the data. In many cases, building managers have multiple systems generating a wealth of information that they can't access.

In any vendor agreement you enter into, you should make sure that you own the data that your building generates. It is also important to standardize this data so that your IoT solution is able to combine different data sources to create even greater value.

## The data value is lost in isolation



# What's theirs must be theirs

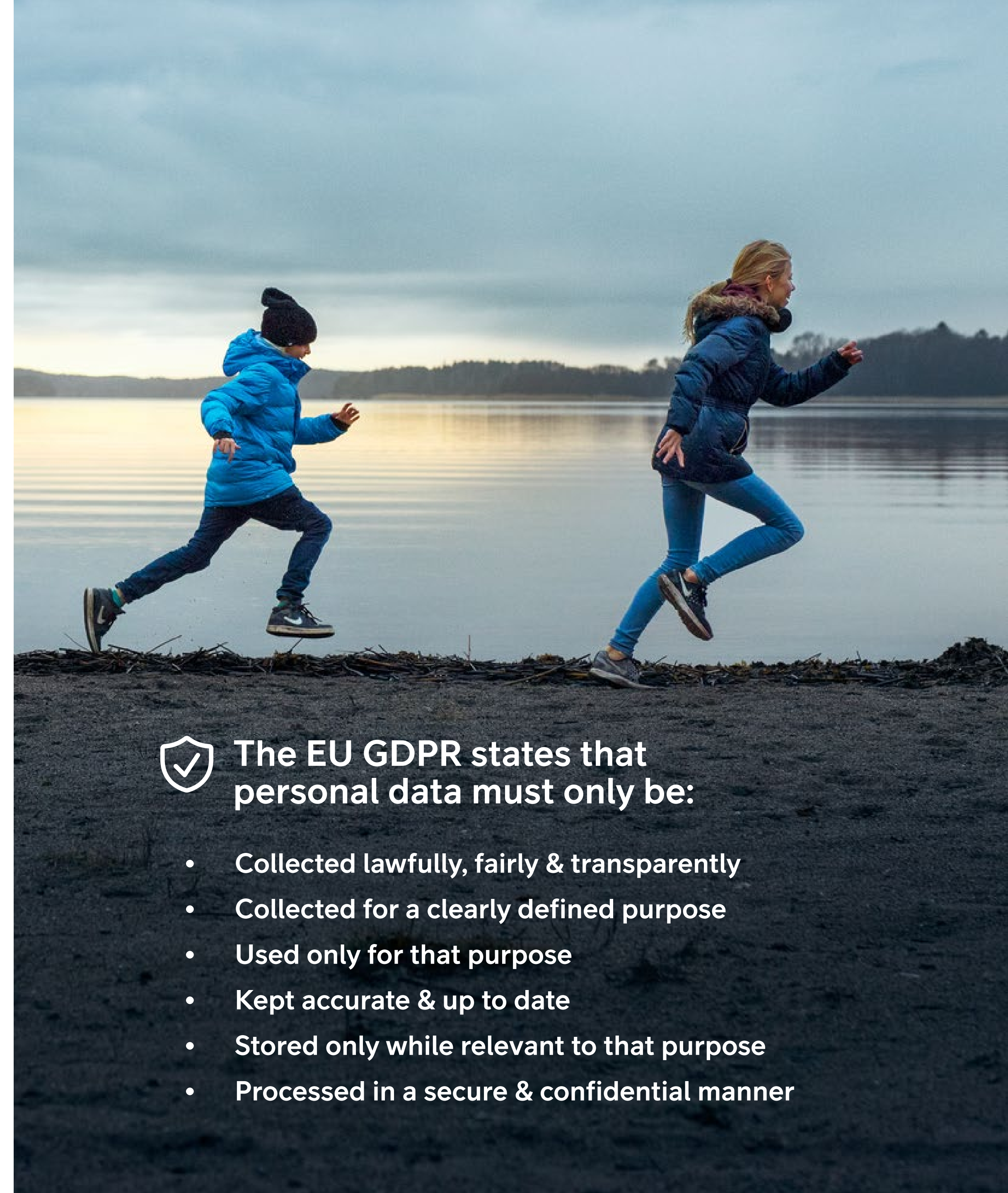
In the case of your tenants however, the reverse applies. They should own their data, not you. And if you are using their personal data without their knowledge, you're not only breaking the law, but also their trust. And in long term relationships, trust is everything.

In any scenario where you will be using your tenants' personal data, you have the responsibility to protect their privacy. This responsibility also extends to any suppliers or sub-contractors you use. To fulfil these obligations it is important to be clear on why you will collect these data and how you will use them. Then you must also take steps to ensure that the data are securely stored, protected and erased when finished. It is also important to get consent from your tenants in order use their data.

The scope and implications of this responsibility are far-reaching. Therefore it is advisable to only choose vendors who have the relevant expertise in processing personal data according to local requirements. This means that even though you will take the overall responsibility for any tenant data you use, your suppliers and partners will be able to notify you of any implications of their part of your smart building system.

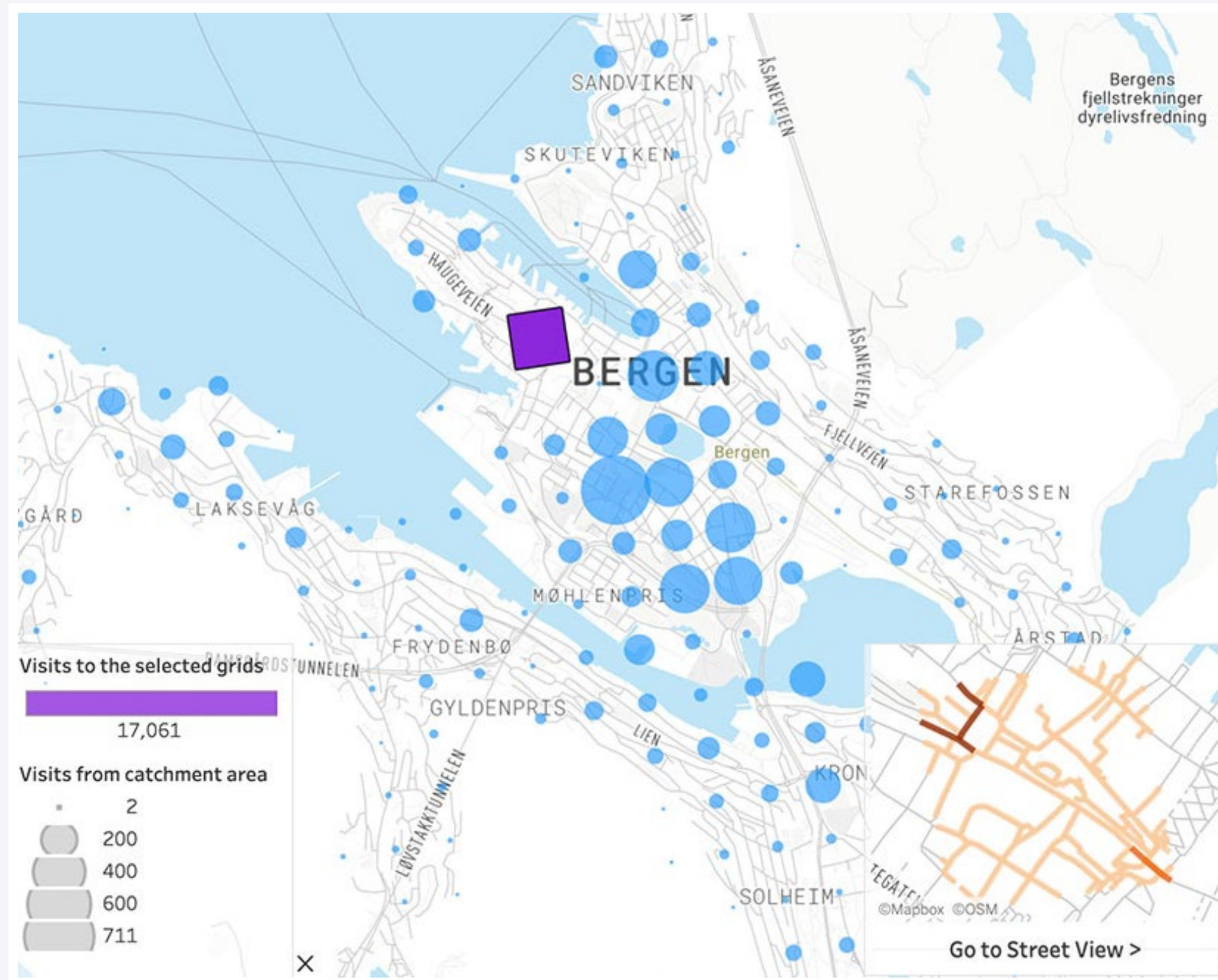


If you use your tenants' personal data, you have the responsibility to protect their privacy and also take steps to ensure that it is securely stored, protected and erased when finished. This responsibility also extends to any suppliers or sub-contractors you use.



**The EU GDPR states that personal data must only be:**

- Collected lawfully, fairly & transparently
- Collected for a clearly defined purpose
- Used only for that purpose
- Kept accurate & up to date
- Stored only while relevant to that purpose
- Processed in a secure & confidential manner



# Measuring activity inside and outside your building

To understand the value of your location; anonymized crowd movement data can give you insights from the area around and inside your building without compromising people's privacy. These insights include the number of people and where they come from

## ← OUTSIDE THE BUILDING

Mobile devices constantly generate movement data by 'pinging' cell towers as they move between. This automatically creates data about crowd sizes and movement patterns in different locations at different times. This data is irreversibly anonymized and aggregated and reveal what's happening around your building. You also get detailed historical data to identify trends such as daily, weekly and seasonal variations.

With unbiased and accurate measurement of people movements, building owners can work in a more data-driven way. These insights can be used when making decisions on the best location to open a new office or another store. They also enable competitor benchmarking and provide strong arguments when it comes to negotiating rental prices and conditions.

## INSIDE THE BUILDING →

At a more granular level, WiFi-based insights can provide information on how crowded shared spaces are. This is of particular relevance in relation to COVID safety. By default, mobile phones automati-

cally search for nearby WiFi networks to provide the option to connect. This makes it possible for routers to count the number of mobile phones in the immediate area. By connecting this data to an IoT platform, it is possible to show how crowded different areas of a building are. This can provide convenient information such as how busy a cafeteria is or which areas have too many people in them. With crowd alerts a facility manager gets the opportunity to easily share information in real time if and where there are more people than recommended.



Norway &gt;

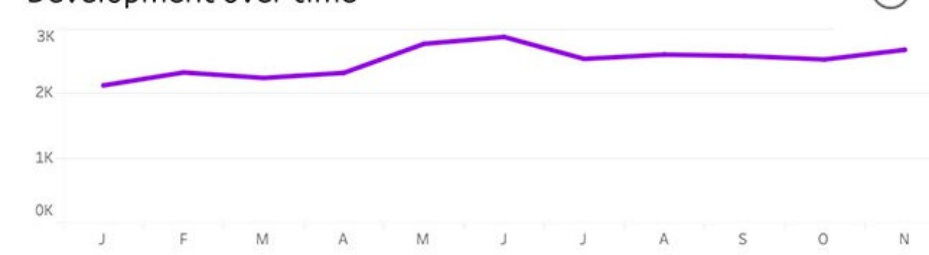
### Klosteret

3 cafes, 5 restaurants, 2 stores.

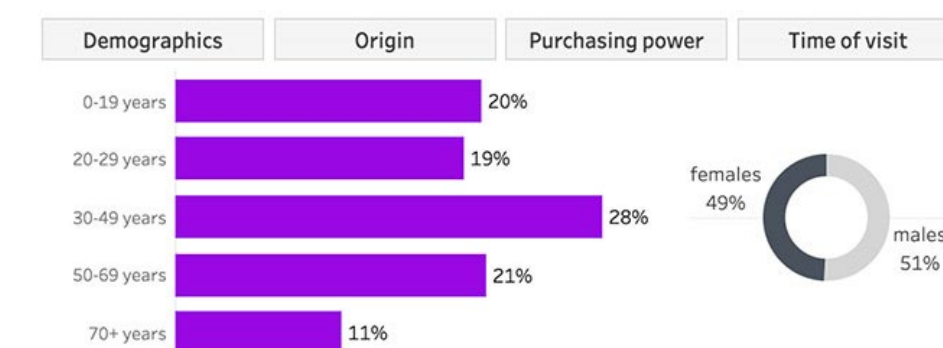
2,501

Area visits per day

Development over time



Visitors



# Connecting buildings

As our lives become more connected, building networks must increasingly act as “arteries” to support the digital needs of everyone inside.

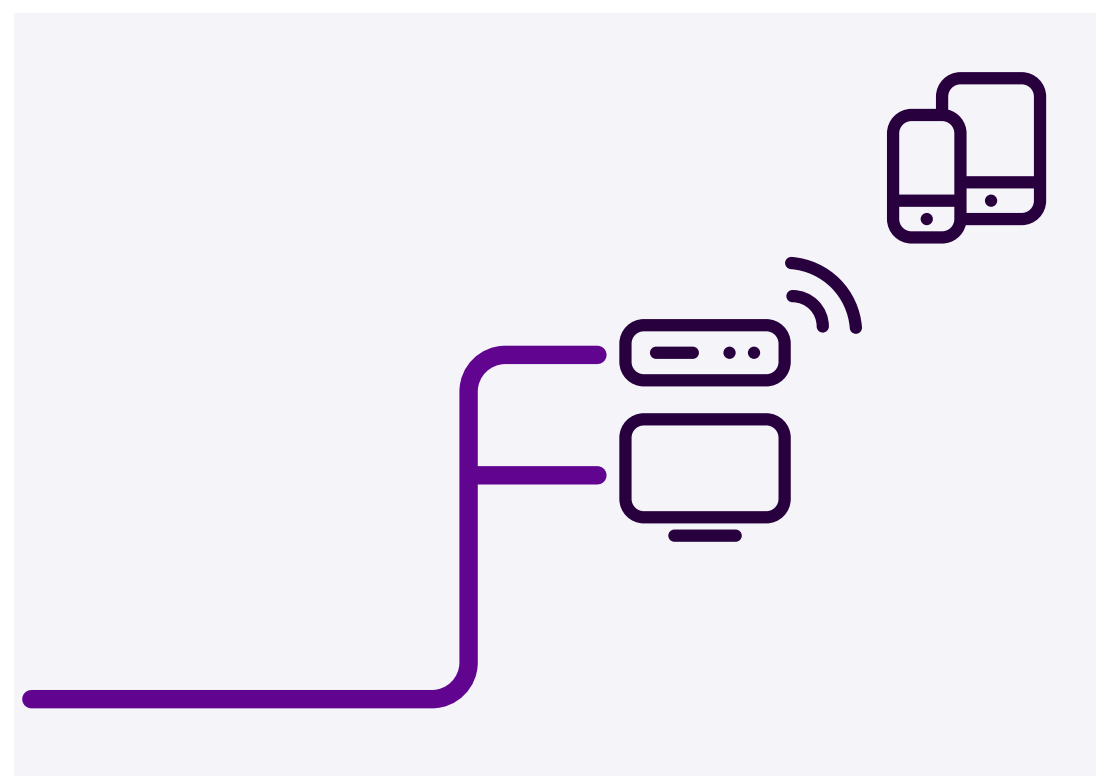
The two most common forms of connectivity used in buildings are the physical fiber or cables inside a building – and the cellular or “mobile” connections that our phones and many IoT sensors use.

## Physical network

The physical network refers to the wires and cables throughout a building. It also includes the routers and switches that enable devices to communicate within the building’s network and Internet, either directly by a patch cable or wireless via a WiFi

access point. In many buildings, copper-based cables are still in use. However, these are in some cases being replaced by optical fiber that delivers much greater bandwidth to meet the needs of today and will be ready for the ever-expanding demands of tomorrow.

Tenants expect broadband that never buffers, connectivity that never glitches and entertainment without limits – and that’s just the start. Commercial tenants also demand ultra-responsive connectivity to their cloud applications and ultra-secure and reliable business networks. Basically, they expect to be immersed in their online experiences and only notice their network if it doesn’t work.



## LPWA for buildings

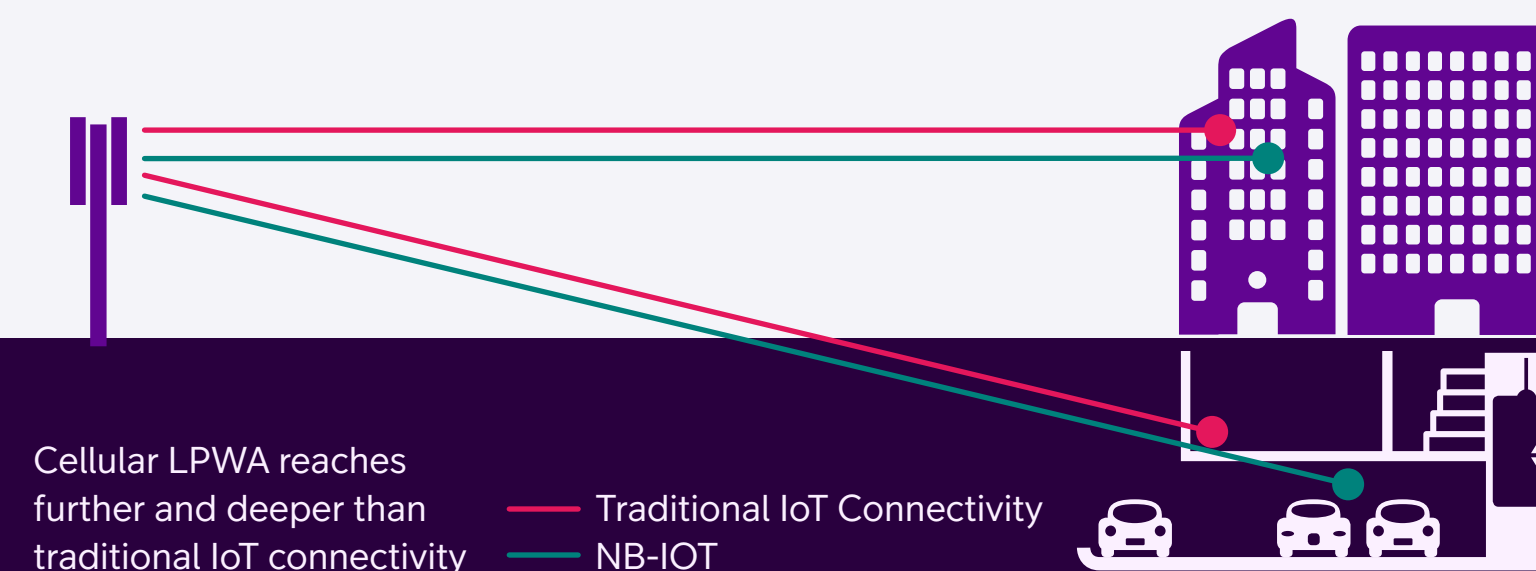
Recent advances in LPWA (Low Power Wide Area) connectivity are opening up new possibilities for buildings. That’s because these technologies were designed specifically for the characteristics needed for IoT. Cellular LPWA is direct-to-network connectivity that doesn’t require expensive installation and can easily be retro-fitted to existing buildings without needing additional gateways and networks. It includes two different standards with different capabilities.



Narrowband IoT (NB-IoT) doesn’t do a lot – and that’s its super power. It is designed for use cases where simple measurements are needed such as room temperature, on/off status of building systems, cycle count for mechanical systems etc. Because NB-IoT only sends small amounts of data, it also needs only a small amount of power. This means sensors can be easily installed and then run for years without needing a new battery. NB-IoT also provides much deeper penetration than traditional IoT technologies. This means it works much better deep inside buildings or underground such as in in car parks and basements.



LTE-M is designed for use cases that require a little more functionality. This includes use cases where sensors are on the move – such as asset tracking. It also works with use cases that need higher data rates – such as low resolution video and voice functions. It is also highly energy efficient, but naturally, use cases that require more functionality will use up batteries faster.



# Network security

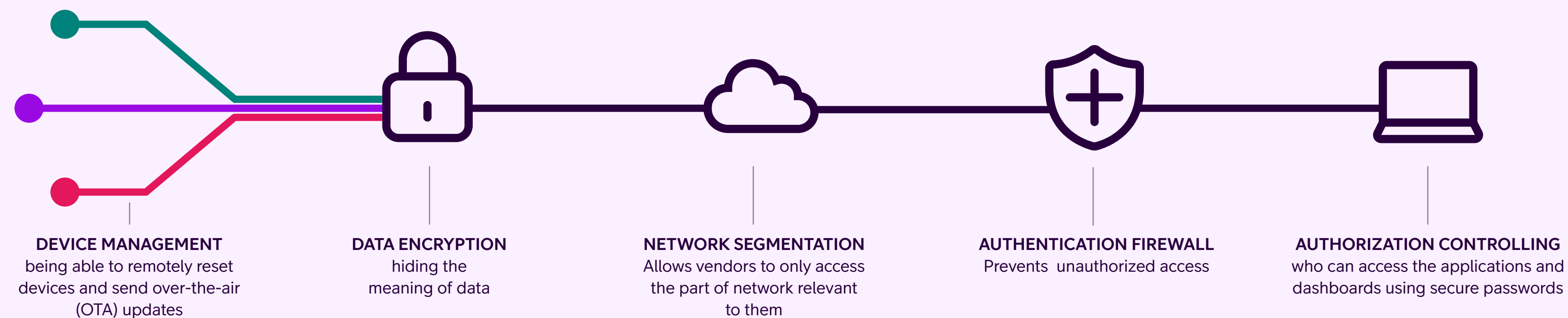
## A battle fought on many fronts

A building's network must meet the increasingly diverse needs of residential and business users, devices and applications. These range from ultra-high data rates to ultra-fast response times – and increasingly, both.

The way your network is configured is essential to meeting these needs. It also determines how well you can protect the safety of your users, their data and their businesses.

To minimize total cost over the life of your building's network, it's important to establish a standard network infrastructure or blueprint and use it for any future renovations. This helps to ensure your

network evolves cohesively rather than splintering into separate networks for different target groups. It also means you can apply security measures across your network. When it comes to these measures, there's no silver bullet. You need to address network security on many levels:



**Cyber attacks** that were previously aimed at computers and servers have now become more sophisticated and challenging. Today phones, tablets, IoT and OT systems can also be subject to attacks by hackers. To keep up with this ever-evolving threat; people need to think beyond traditional security methods.

**A Zero Trust security model** starts with the assumption that all users, devices, servers and network segments are potentially insecure and hostile. It only allows access to the network after they are verified.

Networks can then be “segmented” into different zones that each have their own assigned security and access protocols. Different parties can then be given access only to the parts that are relevant to them. This is often done by segregating traffic between the network segments using virtual local area networks (VLANs) and then applying security protocols via firewalls.

Implementing network segmentation and access control as default features in your network will regulate device's or system's ability to communicate inside the network and with the internet by a policy that you own.



# Part 3: How?

## Making it happen

Plans are nothing without execution. To get your project off presentation slides and into the real world, your organization needs to be ready, as well as your technology. Here are some considerations and tools to get you started.

### Page

- 26. Before you look at technology, take a look at yourself
- 27. Bear this in mind before you start
- 28. Assemble your dream team and choose your sidekicks
- 29. Think big. Start small. & Share your vision
- 30. Get started right away
- 31. This is Telia Smart Building





# Before you look at technology take a look at yourself

The most complex part of making buildings smart is often not the technology – it's your organization. Once you've identified the value you can gain, make a realistic assessment of your organization's readiness to accept, adopt and support the change. Perhaps they're ready now? Perhaps you should start with modest ambitions and build on them? Either way, it's better to be realistic about this from the start than to create an amazing solution that doesn't get adopted.

## THINK ABOUT:

- Who is going to implement this?
- What budget and time resources will be required?
- What skills do we need to add?
- Who is going to sponsor this?
- Who is going to use this and what training will they need?



# Plan smart from the start



## Get buy-in from the top

Mandate matters. Take the time to create a strong business case from the start so you can get the support of management. Wherever possible, quantify the savings you stand to gain to demonstrate the ROI and time-to-value. This is also a good test for yourself to make sure you're on the right track.



## Show the value

Try to go beyond spreadsheets and presentation slides. Sharing a working demo with your organization makes it more “real”. They can more intuitively understand how it will work and the value they will receive. An interactive interface with dummy data from any building will be enough to demonstrate the value.



## Communicate

Keep all stakeholders informed throughout the process. Select ambassadors and evangelists not just to hype the project, but to manage expectations. For tenants, it's important they understand any inconvenience will be for a good reason. For employees, it's important that they don't see it as a threat. For example, the people who empty waste containers will be less interested in ROI and more interested in knowing they will have a dashboard that shows which containers need to be emptied (and that they're not about to be replaced by a robot).



## Get your competencies in order

Developing a smart building solution requires specialist IT skills to integrate your different systems. Think about what mix of partners and inhouse specialists you will need, then don't wait too long to start recruiting – good programmers are in high demand.

You should also assess the skills of those who will be working with your smart building. The change from screwdrivers to digital dashboards will require new skills from your maintenance and facility management teams.



## Good design is cheaper than endless training

When it comes to training, your money is generally better spent making your system intuitive and easy to use rather than needing to spend time and money on extensive training for every new person who will be using your system.



# Assemble your dream team and choose your sidekicks

It's essential to identify all the skills you will need in advance. Often you will have one person who can fulfil multiple roles. But before you begin, identify what you will need, where the gaps are and then decide where you will recruit or partner.



No one size fits all when it comes to a smart building. The existing systems and networks, types of tenants and their needs, as well as your business objectives all shape the ideal solution for your building.

Nobody does digitalization on their own. Getting the right balance between partners and inhouse capabilities is an important part.

Depending on how much you want to do in-house, you may want to procure and manage your own devices and get a partner to provide device connectivity as a stand-alone service. Or you may choose to get a partner to do both. It generally comes down to the size and capability of your IT department and what you choose to prioritize.

The complexity of integrating data from your existing systems can vary greatly depending on the type of system and it's capabilities. This is also an area where skills are in high demand, and recruiting can be difficult. On the other hand, there are real benefits in the ongoing management and development of your solution in-house. Weigh up the costs vs benefits of using integrators and solution providers against recruiting yourself.

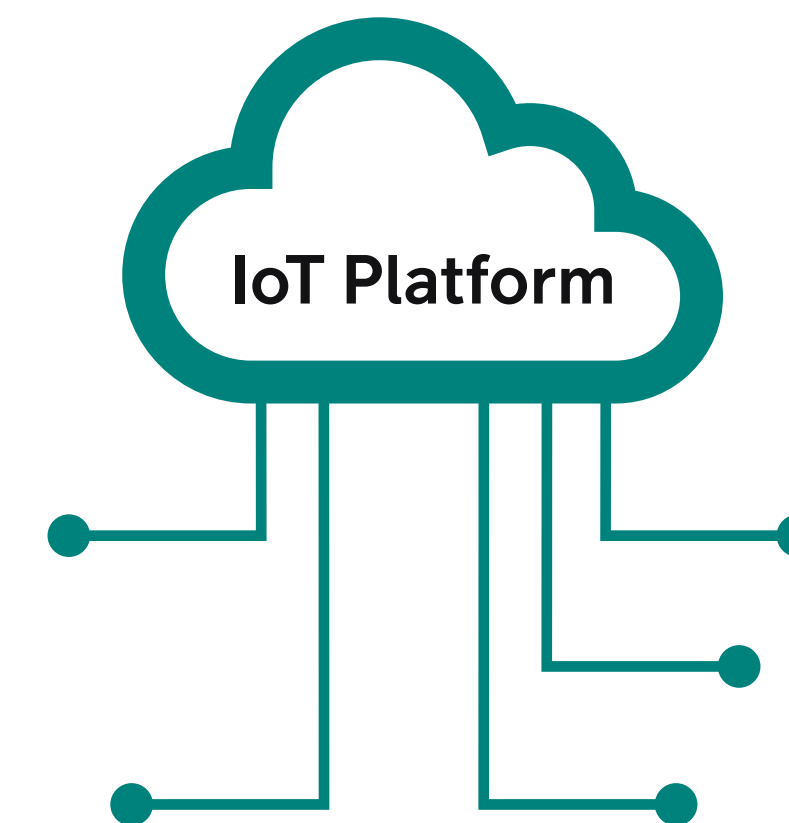
## New data sources

### [ SENSOR & CONNECTIVITY ]

For simplicity and speed-to-value: Choose an end-to-end solution that includes sensors, device connectivity and platform.

### [ SENSOR ] + [ CONNECTIVITY ]

If you have the resources to do to more in-house; you can source your own sensors and purchase device messaging and platform separately.



## Existing data sources

To collect the data from your existing systems – and add future systems – some level of standardization will be needed so they can 'speak the same language'.

# Think big

## Start small

Once you've identified the value, assessed your organization's readiness and completed a needs analysis to understand what sort of data different roles will need; you're ready to get started.

The most important part of getting started is – getting started. Rather than waiting until you have solved every potential issue on paper – start with something small and manageable so you can learn as you scale.

But balance a fast start with putting in place foundations that you can actually scale further down the track. If you build a prototype proof-of-concept (PoC) using technology you can't scale later; you're putting work into a dead end. Many connectivity providers provide test-kits or 'sandbox'

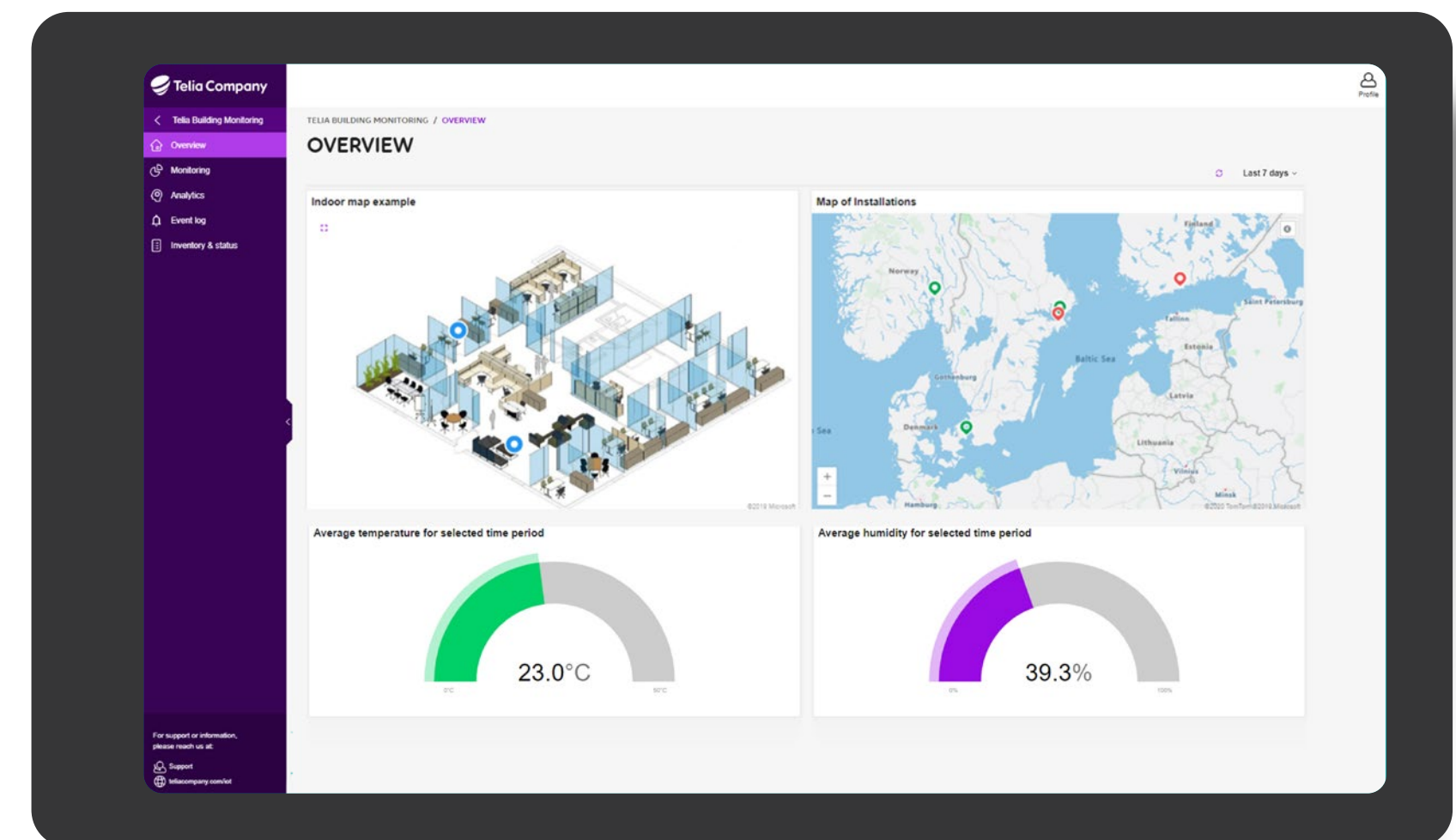
set ups where you can experiment with different technologies that you will be able to scale later once you have proof-of-value.

In terms of which cases to start with, in most buildings, the simplest and fastest ROI comes from capturing real-time temperature data from your building to fine-tune your HVAC. This can be done with temperature and humidity sensors and a basic dashboard. Then you can start to build from there.

# Share your vision

Whether you're just starting your digitalization journey – or want to make your smart buildings even smarter – it always helps to see what's possible and to be able to show others what's possible. So they can intuitively understand the value for themselves. A great place to start is with an interactive demo to make it feel “real”.

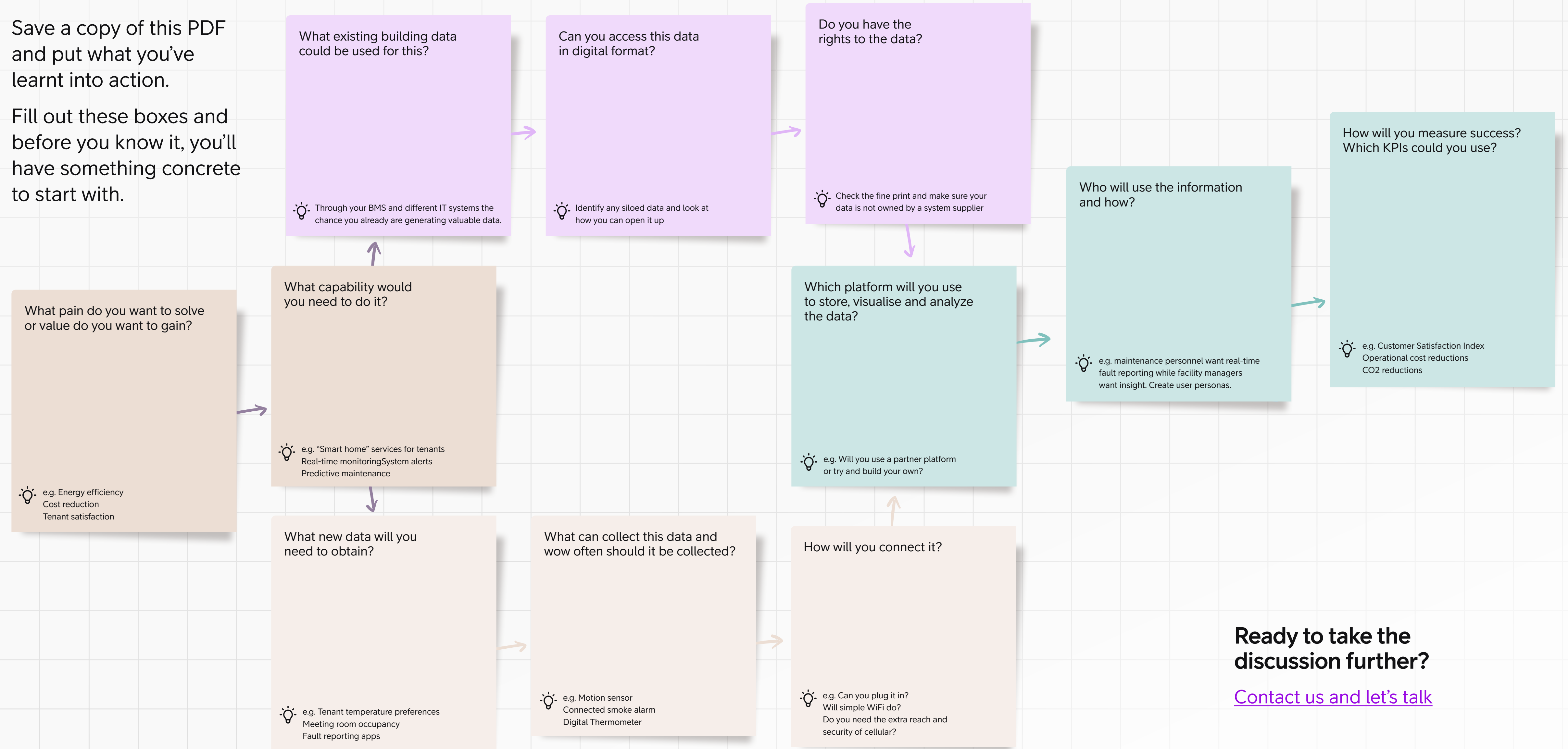
Contact us for a smart building demo



# Get started right away

Save a copy of this PDF and put what you've learnt into action.

Fill out these boxes and before you know it, you'll have something concrete to start with.



**Ready to take the discussion further?**

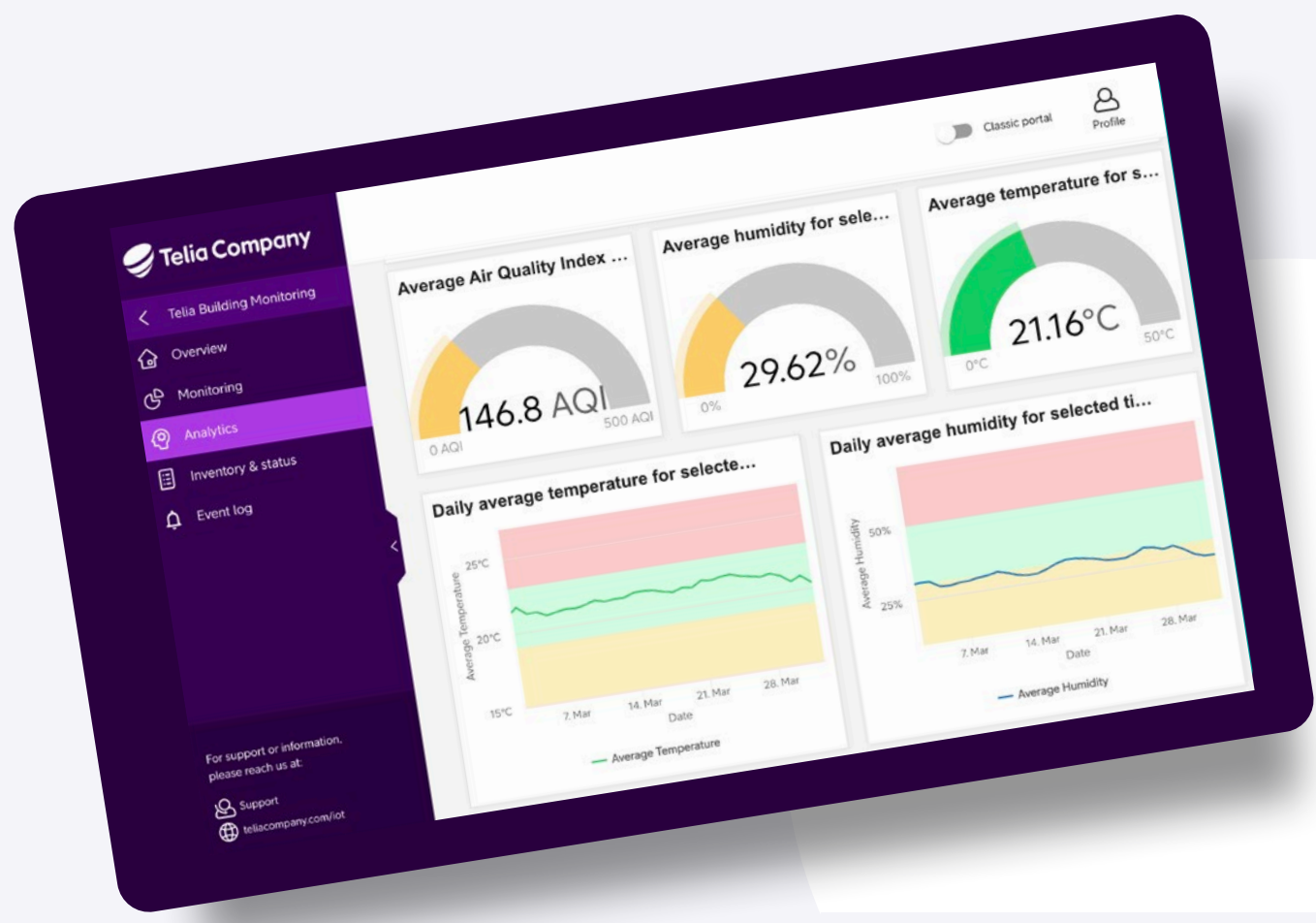
[Contact us and let's talk](#)

# Telia Smart Building

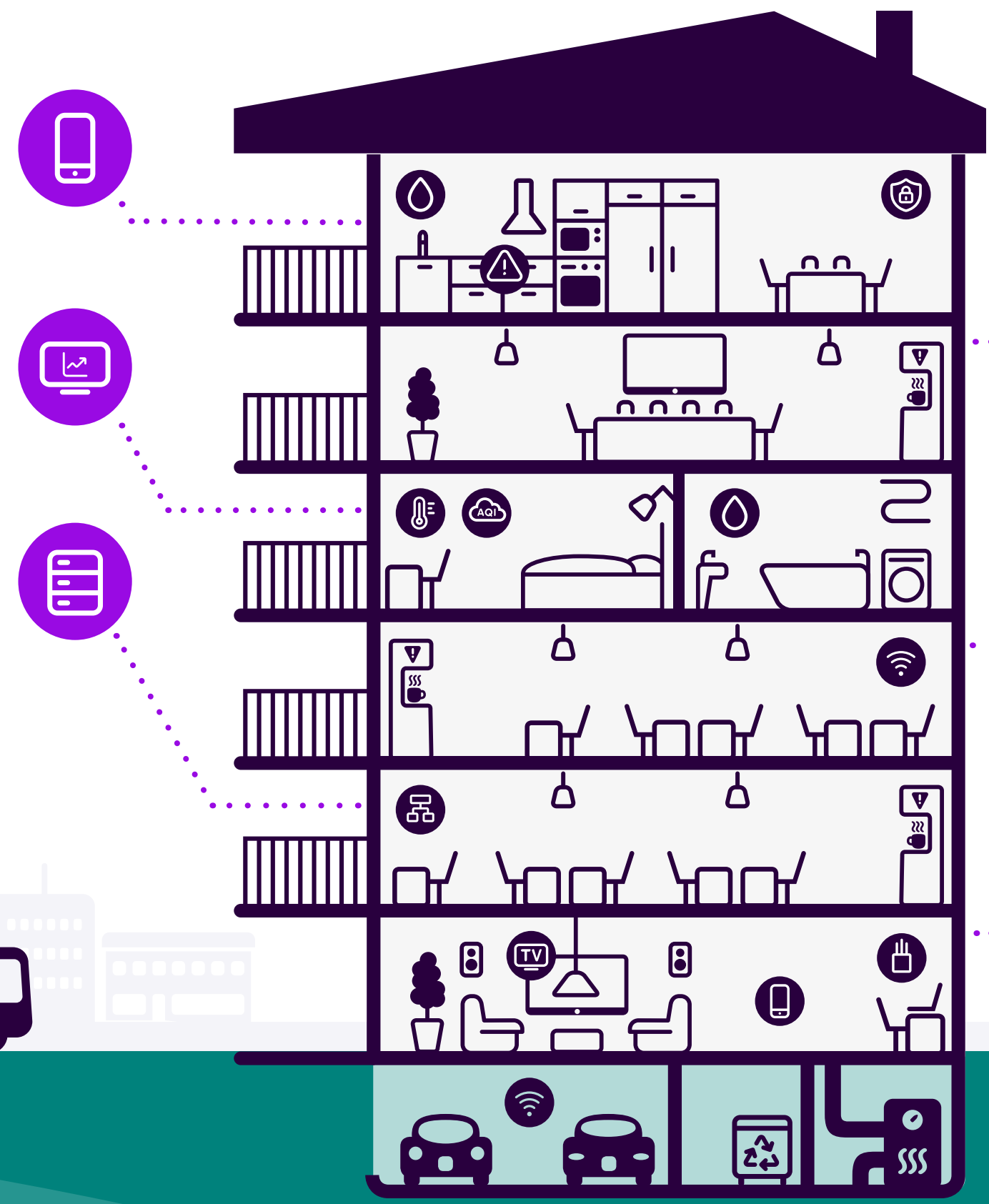
Transform your building without moving a brick

Telia Smart Building is a suite of digitalization tools and services for new and existing buildings. It enables building owners and managers to monitor and optimize building operations, reduce costs and increase sustainability. It also creates a more healthy and comfortable environment for tenants as well as giving them new 'smart' services to simplify their day-to-day lives.

**Book a demo**



- Smart Living**  
 Connect your tenants' fire and water leakage alarms and give them 'smart' services to simplify their day-to-day lives.
- Building Monitoring**  
 Monitor your building in real time and gain deep insights into how to make it more energy efficient, comfortable, sustainable and profitable.
- Real-Estate IT**  
 Consolidate and secure your IT infrastructure to maximise building IT efficiency and minimise network life cycle cost.



- Crowd Insight**  
 Gain location insights from crowd movement patterns: how many people, where and when from anonymized and aggregated mobile network data and WiFi probe data.
- Real-Estate WiFi**  
 Connect all of your commercial tenants with fast and reliable WiFi throughout your building so they can stay seamlessly connected.
- Communication infrastructure**  
 Futureproof your building with open fiber to let your tenants choose their providers – and offer them the very best in TV, Telephone and Broadband packages as well.



## Telia IoT Platform

Collect, store and visualize your building data for real-time monitoring and optimization. Then unlock insights to enable predictive maintenance and new revenue and service opportunities. With an open API you can integrate your BMS data and third party data to gain a full overview of your building.

If you want to learn more about the value you can gain from making your buildings smarter, or would like help getting started with a digitalization plan, let's talk. Contact us and book a demo!

e: [iot-sales@teliacompany.com](mailto:iot-sales@teliacompany.com)

w: [business.teliacompany.com/internet-of-things/smart-buildings](https://business.teliacompany.com/internet-of-things/smart-buildings)

