nordnest

3. The Problem with Traditional Construction

Despite appearing efficient on paper, traditional centralized building services often create **compounding technical, scheduling, and cost risks** that are costly and difficult to fix.

3A: Late-stage Design Creates Chaos on Site

On almost every construction project, installations heating, water, ventilation, electricity are treated as something to 'fit in later,' with electrical routing and load coordination often finalised only once walls, shafts, and ceilings are already fixed. The architect finalizes the layout, walls and shafts are drawn, and only afterwards do engineers get asked: *"Now, can you make the technical systems work?"*

At that moment, the problems are already baked in. The bathrooms may be placed too far apart, risers might cut across beams, and there's rarely enough space in corridors or ceilings. What looks like a finished design becomes a puzzle of compromises.

What typically happens

- Bathrooms are scattered across the floorplate instead of stacked. This forces long horizontal runs, extra bends, and more penetrations through slabs and walls.
- Risers end up in awkward positions, eating into rentable area or forcing last-minute shifts to structure.
- Multiple trades - plumbers, electricians, ventilation installers - are squeezed into the same tight zones, constantly tripping over each other.

  The growing scarcity of skilled installers in Sweden amplifies this unpredictability, increasing both delays and variation.
- Work is often done in the wrong order: walls go up before shafts are coordinated, so contractors return later to cut, patch, and reroute.

> **It's a bit like designing a car by building the body first and only afterwards asking, *"Where can we fit the engine and wiring?"* The result is messy and inefficient - and often dangerous.**

The consequences

Schedule delays: Because installations don't fit as drawn, contractors re-route on site. This causes out-of-sequence work and missed milestones.

Cost overruns: Every reroute means wasted material and labour. And because mistakes are found late, change orders multiply.

Contract disputes: Overlapping responsibilities lead to arguments over "who owns what." Does the ventilation contractor cut the holes, or the builder? Should the plumber insulate pipes, or a separate subcontractor? These disputes consume management time and slow the project.

Site overhead: More trades are kept on site for longer, meaning more site huts, more supervision, and higher overhead costs.

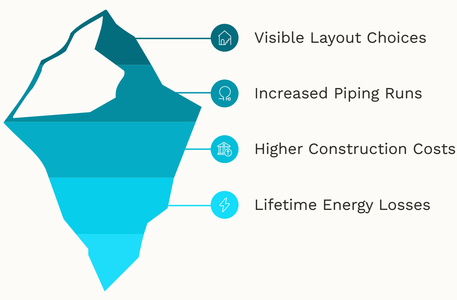
Weak inspections: With so many overlapping fixes, continuous inspection loses effectiveness. Small mistakes slip through, only surfacing after handover.

Why this keeps happening

The problem is process-driven: installations are treated as secondary instead of integral. Architects protect space for windows, balconies, and staircases - but not for pipes, ducts, or shafts. By the time MEP (Mechanical, Electrical, and Plumbing) engineers enter, they are working with "leftover space."

And installations aren't like finishes. You can't just move a pipe the way you move a wall. Every extra meter adds cost, pressure drop, heat loss, and energy waste.

Real-world examples



In senior housing, poorly coordinated layouts led to long rerouted circulation lines that caused chronic pressure drops. Apartments at the end of the line were cold, triggering 50-100,000 SEK investigations just to identify the problem - before any repairs were made.

The core takeaway

When design comes too late, installations stop being an asset and become a liability. The project inherits inefficiency, risk, and conflict that no amount of site management can fully solve.

Ekonod turns this problem on its head. By moving from late design to early configuration, the bathroom isn't an afterthought - it becomes the anchor for all installations. Instead of patchwork rerouting, projects get clear, tested modules that fit the building from day one. The result: fewer disputes, less chaos, and predictable outcomes.

3B: Centralized Architecture Concentrates Failure and Risk

At first glance, a centralised system seems logical: one large plant room, one undercentral (UC), and a few vertical shafts carrying heat, hot water, and ventilation to every apartment. It looks clean in the drawing - a single "heart" pumping life to the whole building.

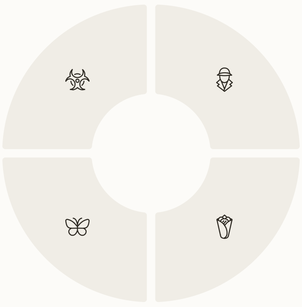
But what looks tidy on paper becomes fragile in practice. Because all services are bundled and distributed from one source, **any weakness at the centre spreads across the entire building.**

Single Point of Failure

A pump fault, leaking riser, or blocked valve in the UC can instantly impact **every single apartment connected downstream**.

Systemic Fragility

One crack and the whole basket fails. Tenants lose trust because the whole building feels unreliable.



Expensive Investigations

Finding root causes means opening apartments and chasing pipes. Just the investigation costs **50,000–100,000 SEK**.

Complex Commissioning

The entire building must be balanced at once. Small errors ripple through the rest, creating hot and cold spots.

Why centralization creates fragility

Imagine your home Wi-Fi: if the router goes down, your entire house loses internet. Now imagine a whole building relying on a single router for all its services – not just internet, but heating, hot water, and ventilation. If that one central system has a hiccup, the whole building feels it.

This isn't just about technical failure; it's about the human experience. When one small part of the system breaks, it can disrupt hundreds of lives, leading to a cascade of complaints and distrust.

Investigations: expensive and disruptive

When there's a problem in a centralised system, pinpointing the cause is like finding a needle in a haystack. Because centralized systems lack granular digital monitoring, faults often remain invisible until secondary damage occurs. Is it a pump issue? A clogged pipe somewhere? A fault in the controls? Solving it requires extensive investigation, often involving:

- Opening walls and ceilings in multiple apartments.
- Running complex diagnostics and tests across the entire network.
- Disrupting tenants' lives with noise, dust, and loss of service.

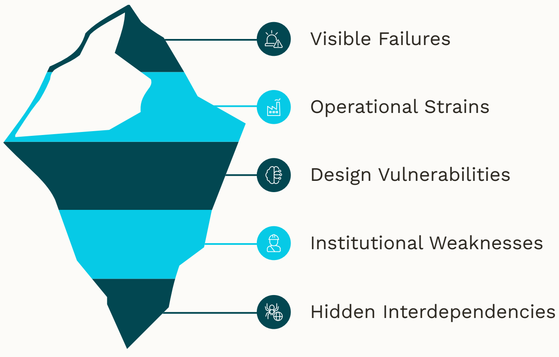
For example, in a Swedish senior housing project, a minor issue in the central ventilation unit led to uneven airflow throughout the building. Identifying the cause required a **100,000 SEK investigation**, disrupting dozens of elderly residents, before a single repair could be made.

Commissioning: one big balancing act

Getting a centralised system to work perfectly is an art form. Every valve, every pipe, every sensor needs to be finely tuned to ensure even distribution of heat, water, and air throughout the building. It's a massive balancing act:

- Adjusting one part of the system can throw off another.
- Small errors amplify, leading to "hot spots" and "cold spots" that frustrate tenants.
- The process is time-consuming and often requires multiple iterations, delaying handover.

Systemic fragility



Because all services depend on a single central point, the entire building becomes inherently fragile. One leak, one control glitch, or one component failure can bring the whole system down. This leads to:

- **Loss of tenant trust:** Residents experience widespread failures, making them doubt the building's reliability.
- **Reputational damage:** Developers and property managers face a barrage of complaints, impacting their standing.
- **Chronic problems:** Issues often persist, requiring ongoing troubleshooting and patch fixes.

Ultimately

Centralised architecture, while seemingly efficient on paper, often concentrates failure and risk in practice. It creates a single point of failure, makes investigations costly and disruptive, complicates commissioning, and leads to systemic fragility.

Ekonod turns this paradigm on its head. Instead of a single "heart" that can fail the whole body, our modular, decentralised approach distributes services, ensuring that a problem in one area doesn't cascade throughout the entire building. This reduces complexity, improves reliability, and drastically cuts down on post-occupancy issues and disputes.

3C:Energy Waste Baked into the Topology

Energy efficiency is not just a design target - it is the backbone of long-term building economics. Yet traditional centralized systems carry inefficiency in their very DNA. No matter how well you insulate, no matter how carefully you balance, you cannot escape the fact that the topology itself forces energy to be wasted every single day.

How circulation works in centralized hot water systems

In a conventional building, hot water is produced in a central plant and then circulated through long risers and distribution loops so that every apartment has "instant" hot water at the tap.

This sounds like a benefit to the tenant, but here is the hidden problem:

The water is kept moving **all day and all night**, even when nobody is using it.

Every meter of pipe becomes a miniature radiator, leaking heat into walls, shafts, and floors.

Even with insulation, these pipes are constantly losing energy, like having a tap dripping warm water 24/7.

20-30%	55-60°C	24/7
Energy Lost	**Higher Temperatures**	**Continuous Operation**
Of the total hot water energy lost before it even reaches the tenant. Even the most efficient centralised equipment cannot eliminate circulation losses - only decentralised systems with optional spillwater heat recycling can remove these losses entirely.	Required to ensure the last apartment receives hot water, increasing losses.	Like having dozens of kettles running in parallel, burning energy continuously.

The "hidden boiler" effect

> Imagine leaving a kettle on boil in a locked cupboard, 24 hours a day, just so you don't have to wait 15 seconds for hot water. That is effectively what centralized hot water circulation is doing.

The system is burning energy continuously, just to keep pipes primed.

And because circulation loops are long and winding, it's not just one "kettle" - it's like having dozens running in parallel. The result: a huge invisible boiler system that no one sees but every tenant pays for in their bills.

Why centralized systems run hotter

To ensure that the last apartment on the farthest branch still receives hot water, centralized systems are forced to operate at higher supply temperatures.

Instead of running efficiently at 40°C–45°C, they may need to supply at 55°C–60°C.

This raises distribution losses even further, because the hotter the water, the greater the heat leakage through pipe walls.

Pumps also work harder, pushing water longer distances and across more friction.

It's a vicious circle: more distance → higher temperature → higher losses → higher bills.

Why decentralization breaks the cycle

Ekonod's apartment-based modules cut the loop down to a single home.

Each unit has its own hot water preparation, meaning there is no circulation loop.

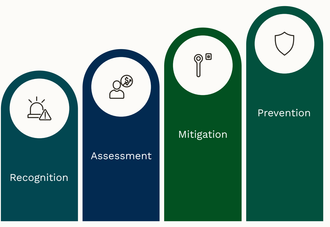
Water is only heated when needed, in the apartment.

Supply temperatures can be lower because the distance from source to tap is only a few meters.

This means zero circulation losses and significantly lower standby consumption.

The cost curve is not flat

It's important to understand that this waste is not just a fixed "tax" on the building. It grows worse over time.



- Energy tariffs increase by 3–5% per year on average.
- CO_2 pricing and carbon taxes are adding extra cost layers.

Over a 25-year building lifecycle, the energy wasted in circulation becomes a massive compounded financial penalty.

This is why the difference between centralized and decentralized isn't just 20–30% in year one. By year 20, the gap in lifetime cost can be two or three times larger. Centralized systems "leak money" more and more each year.

Comfort trade-offs that never work

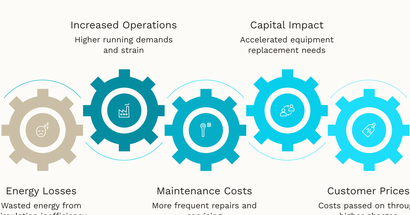
Operators of centralized systems often face a no-win situation:

- If they keep circulation running at high flow, tenants are happy with instant hot water - but the energy bill explodes.
- If they slow circulation or lower supply temperature to save energy, tenants face long waits for hot water or suffer from cold complaints.

This balancing act is permanent and impossible to solve within a centralized topology. With Ekonod's decentralized modules, the trade-off disappears: hot water is prepared locally, instantly, and without circulation losses.

The extra costs nobody sees

It isn't just wasted energy. Circulation losses force additional costs at every stage:



- **Oversized equipment:** Central plants and pumps must be larger to compensate for continuous background loads.
- **Insulation material:** Every meter of pipe must be insulated, but insulation only slows losses, it never removes them.
- **Lost rentable space:** Shafts and corridors are sized to carry long distribution lines, eating into GFA that could otherwise generate rental income.

These are structural inefficiencies: money is being spent on pipes, insulation, and space just to carry waste heat around.

Bottom line

Centralized circulation is like a leaking bucket. No matter how much energy you pour in, a large share slips away before it reaches the tenant. The problem is not bad workmanship or bad commissioning - it is inherent to the centralized design itself.

Ekonod removes the leak by removing the loop. Each apartment generates hot water locally, on demand. That means:

- No 24/7 circulation losses.
- Lower supply temperatures.
- Smaller equipment.
- Lower bills, lower CO_2, and less wasted space.

In a world of rising energy costs and tightening carbon regulations, this is not just a technical improvement - it's the difference between a building that bleeds money and one that generates value for decades.

3D: Contracting Complexity = Delay, Claims, Margin Stacking

One of the biggest frustrations in traditional construction is that installation work – heating, plumbing, ventilation, electricity – gets divided into so many separate packages that nobody really has control. On paper, the contracts look neat. Each subcontractor has their scope, their drawings, and their schedule. But once work begins on site, those neat lines blur. Suddenly the plumber, the electrician, and the ventilation contractor are all working in the same space, each depending on the other, and each insisting that a particular responsibility does not belong to them.

Electrical scope is particularly affected, as routing, cabinet placement, and interface responsibilities are often split across multiple contractors, increasing coordination risk and on site improvisation.

This is where projects begin to unravel. A wall goes up, only to be opened again because someone forgot to allow space for a duct. A plumber installs a pipe but leaves out insulation, saying that belongs to a different contract. A shaft turns out to be too small, but no one wants to carry the cost of resizing it. Every one of these issues results in arguments, delays, and claims. And because the contracts overlap, there is rarely a clear answer to the question: who owns this problem? The result is often that the developer pays anyway, either through change orders or extended site time.

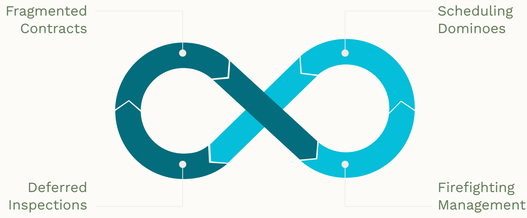
Main Contractor
Hires subcontractor, adds margin

Subcontractor
May hire another, adds margin

Installer
Actually fits the pipe, cost has passed through multiple companies

There is also the hidden cost of margin stacking. In a typical project, the main contractor hires a subcontractor. That subcontractor may then hire another. Each step in this chain adds its own overhead and margin. By the time an installer actually fits the pipe or hangs the ventilation duct, the cost has passed through three or four companies, each of which has added its own profit. The developer pays for all of this, but receives no additional quality in return. It is simply inefficiency built into the delivery model.

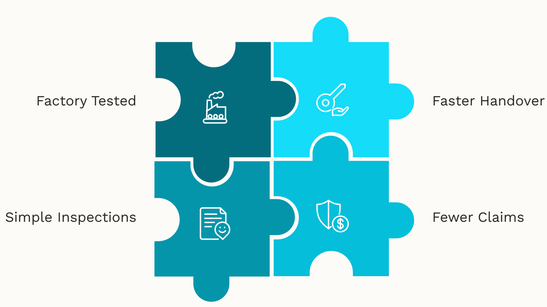
> The effect of this fragmentation on the schedule is significant. When one subcontractor falls behind, every other trade that depends on them is delayed too. Like dominoes, a single slip pushes the program out week by week. In the meantime, more trades must remain on site, which means more site huts, more supervision, and more coordination overhead. Site managers, instead of managing progress, spend their time firefighting disputes and rearranging timetables. And because so many different contractors are working on overlapping systems, inspections become weaker as well. Continuous inspections are supposed to catch small issues early, but in this environment they often miss problems entirely because responsibility chains are so unclear. By the time defects show up - often after tenants have moved in - the cost of repair is many times higher.



We have seen this play out repeatedly. In one Stockholm project of around 40 apartments, installation costs ended up averaging about 300,000 SEK per unit. When the project was analyzed afterwards, much of this cost had not come from materials or genuine complexity, but from stacked subcontractor margins, rework due to poor coordination, and the extra site overhead caused by too many overlapping trades. The irony was that this project had used prefab bathroom pods, which were meant to reduce complexity. And they did help a little, removing some logistics. But because the rest of the system was still centralized and fragmented, the pods did not solve the real issue. The chaos continued everywhere outside the bathroom walls.

Ekonod changes this picture completely. Instead of having five or six different contractors fighting over the same square meters, the installation hub is delivered as a single integrated module. It is designed, built, and tested in the factory, so by the time it arrives on site it is already complete. Installation on site is no longer improvisation but connection. One team can place the module, connect the main services, and move on. There is no confusion about who is responsible, because the module is a single package. The reduction in trades is dramatic – instead of electricians, plumbers, and ventilation contractors all working in parallel inside one apartment, the work is consolidated into a single, streamlined process.

> The benefits extend to inspection as well. Because modules are factory tested, site inspections no longer require hunting for hidden faults behind walls or above ceilings. Inspectors simply verify the connections. This eliminates a huge amount of uncertainty, reduces the number of claims, and accelerates handover.



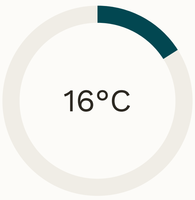
In short, centralized contracting is fragile because it fragments responsibility and creates inefficiency at every level. Developers end up paying for rework, delays, and stacked margins, while site managers waste energy firefighting instead of managing. By contrast, Ekonod provides a clean, consolidated package. It replaces chaos with clarity, reduces risk of claims, and simplifies both supervision and inspection. The result is a calmer site, a faster program, and a more predictable cost base – the exact opposite of what most developers are used to in today's projects.

3E: Installation Errors That Kill Performance

Another major weakness of traditional, centralized building systems is that they leave almost no room for error. Because the systems are so interconnected, a single mistake - sometimes something as small as a wrongly connected coil or a poorly sealed duct - can quietly undermine the entire building's performance. These errors are not always visible during construction. They often only surface months later, after tenants have moved in, when complaints start to arrive and energy bills come back higher than expected. By then, the cost to correct the issue is far greater than if it had been caught during installation. Factory-built hubs eliminate these risks by applying controlled tolerances, verified moisture protection, and standardized connections before arriving on site. Electrical misconnections, late added control wiring, or inconsistent cabinet layouts are common contributors to these hidden performance failures.

> Centralized systems, with their long pipe runs, multiple risers, and networked loops, are extremely vulnerable to small mistakes. A misbalanced valve in one branch can create low temperatures in apartments dozens of meters away. A circulation pump set at the wrong speed can either waste vast amounts of energy or starve the system of flow entirely. A poorly insulated joint hidden in a shaft can bleed heat year after year, invisible to the eye but adding tens of thousands of kronor to operating bills over the building's life. And when these problems are finally investigated, the cost is staggering: 50,000 -100,000 SEK per investigation, just to trace the problem through shafts and behind walls - before any repair is made.

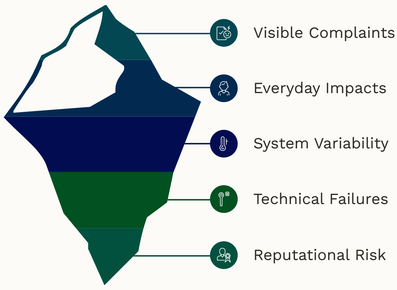
SEK per investigation to trace problems through shafts and behind walls



Temperature in senior housing wings during winter due to circulation faults

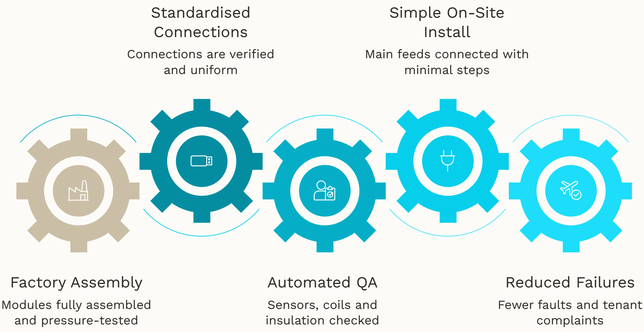
Months typical delay before tenant complaints surface after handover

The worst part is that tenants are the ones who feel the consequences first. A family moves in and finds their apartment never quite warms up. Seniors in a housing block complain of rooms at 16°C in winter, even while their neighbors have overheated bedrooms. Hot water takes too long to arrive, or fluctuates mid-shower. These are not abstract technical issues; they are lived experiences that create dissatisfaction, complaints, and reputational risk for developers and housing associations.



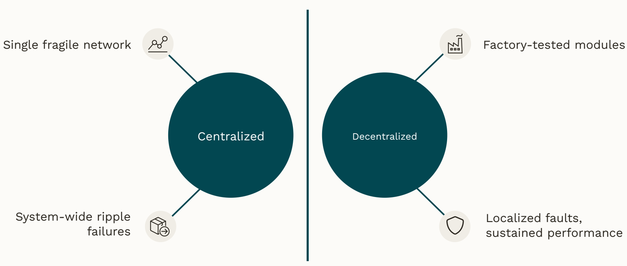
In centralized projects, fixing these errors is disruptive. Walls and ceilings have to be reopened. Entire risers might need rebalancing. Crews have to return months after handover, at a time when tenants are already in place. It is the worst possible scenario for cost, schedule, and customer trust.

Ekonod eliminates this fragility by moving installation complexity into the factory. Modules are fully assembled and pressure-tested before they ever leave the production line. Connections are standardized and verified. If a sensor is not functioning, if a coil is not connected, if insulation is missing - it is caught in the factory, not after six months of tenant complaints. On site, installation is reduced to connection of main feeds, meaning there are far fewer opportunities for human error.



Just as importantly, decentralization contains the risk. If something does go wrong in an Ekonod module, the impact is limited to a single apartment. The rest of the building continues to function normally. Maintenance teams know exactly where to go, and the problem can be isolated and resolved quickly, without tearing into multiple homes or disrupting dozens of residents.

In short, centralized systems amplify mistakes because every apartment is tied into the same fragile network. One small error can ripple across an entire building, and by the time it is discovered, the repair is expensive, slow, and reputation-damaging. Decentralized, factory-tested modules change this dynamic completely. Errors are caught earlier, faults are localized, and performance is protected. The result is a building that not only performs as designed on day one, but continues to perform consistently over its lifetime - without the hidden risks that plague centralized projects.



3F: Operations & Maintenance Burden (and Anxiety)

When people think about building costs, they often focus on the upfront budget: construction materials, contractor invoices, delivery dates. But for property owners, the **real cost of a building is spread across decades**. What matters most is not just how much you spend on day one, but how much money, time, and stress you will spend maintaining and repairing the building year after year. Without apartment-level digital monitoring, tracing faults in centralized systems requires invasive, building-wide investigation long before the root cause is identified.

And this is where centralized installation systems turn into a financial time bomb. Even when everything looks perfect at handover - the systems are signed off, the commissioning documents are in order, and the tenants move in happily - the weaknesses are already built into the design.

Why centralization means systemic risk

> In a centralized setup, the building's heating, hot water, and sometimes ventilation all pass through a few critical points: an undercentral (UC), shared risers, and long circulation loops. This makes the system **fragile by design**.

1 — Immediate Vulnerability
If the undercentral fails, the entire building loses heating and hot water in one moment.

2 — Widespread Discomfort
If a circulation loop develops a blockage or an imbalance, multiple apartments suffer cold radiators or delayed hot water.

3 — Amplified Impact
Even minor faults - a leaking valve, a mis-set pump - can create building-wide discomfort.

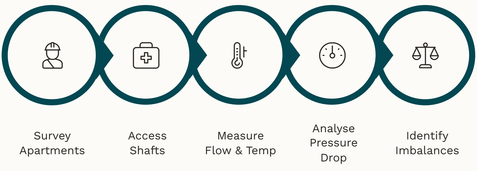
4 — Systemic Spread
The property manager now faces a fundamental problem: small issues no longer stay small. Because the system is so interconnected, they spread across the whole building.

The cost of fault tracing

Finding the source of a problem in such a system is expensive and disruptive.

Let's say tenants complain that water takes too long to heat, or that temperatures fluctuate between floors. To diagnose this, technicians may need to:

- Enter multiple apartments.
- Open up shafts or ceilings to measure flow and temperature.
- Run pressure-drop investigations to identify imbalances in the circulation



These investigations are not quick callouts. They often cost 50,000–100,000 SEK each, sometimes more if access is difficult or multiple contractors are involved. And remember — this is just the cost of diagnosis. The actual repair comes on top.

By the time the issue is resolved, several years' worth of expected energy savings may have been completely erased by one service incident.

Why equipment multiplies the burden

Centralized systems also need a lot of supporting equipment just to function. Pumps, balancing valves, heat exchangers, controllers - all of these run continuously. They wear out. They need calibration. They require service contracts.

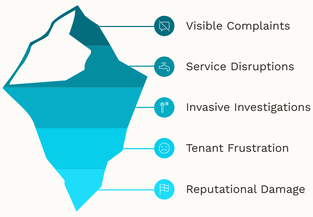
And because the equipment is oversized to serve entire buildings, the stakes are higher. Replacing a failed pump in a centralized loop is not a minor job - it often means planned shutdowns, temporary service outages, and heavy costs.

In other words, centralized systems don't just cost more in day-to-day energy. They also build in a lifetime of high service costs and dependencies.

The human side: tenant disruption

For tenants, this translates into disruption.

- A riser repair might mean half a building goes without hot water for days.
- Investigations often require technicians to enter multiple homes, creating frustration and eroding trust.
- Even when problems are fixed, tenants remember the discomfort. The building develops a reputation: "Things never quite work here."



For housing associations and developers, this reputation damage is as costly as the technical bills. Unsatisfied tenants create complaints, turnover, and pressure on the owner to "do something."

How decentralization changes the picture

With Ekonod, the maintenance dynamic is completely different.

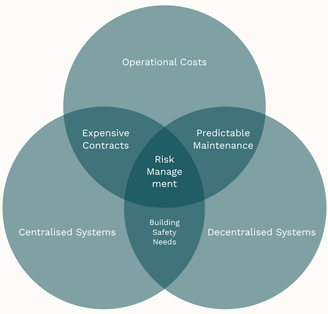
Each apartment has its own installation hub. If a module develops a fault, only that apartment is affected. The rest of the building continues operating normally. Service teams know exactly where to go, and the repair is contained. Instead of chasing hidden leaks through risers and shafts, the problem is localized to a single point.

And because the modules are assembled and pressure-tested in the factory, the risk of faults is far lower to begin with. Site connections are minimal and standardized, which means fewer chances for errors that later snowball into service calls.

Lifecycle economics: OPEX vs CAPEX

Over 25–50 years, the difference is dramatic.

- Centralized systems tie owners into a cycle of expensive service contracts, investigations, and repairs that scale with building size.
- Decentralized systems cap the risk. They simplify service, reduce the number of systemic failures, and keep maintenance costs predictable.



In lifecycle terms, the saving is not just a few percent - it is the difference between a building that eats money every year, and one that protects its owner's long-term operating margin.

The reality

Centralized systems look fine on the day of handover. But across decades, they bleed money, time, and trust. Every investigation, every fault, every shutdown compounds into a growing burden for owners and operators.

Ekonod removes that burden. By distributing risk and containing faults at the apartment level, it transforms maintenance from a building-wide crisis into a simple local task. That means lower lifecycle costs, fewer complaints, and buildings that perform not just in year one, but for decades to come.

3G: Tenant Comfort and Indoor Climate Instability

At the end of the day, buildings are not judged by drawings, specifications, or even energy certificates. They are judged by the people who live in them. And tenants - whether private families, students, or seniors - have very clear expectations: the apartment should be warm in winter, cool in summer, and hot water should be available the moment they turn on the tap.

When these expectations are not met, frustration builds quickly. It may start with small complaints, but over time it erodes trust in the property and in those who operate it. For housing associations, this can mean more churn, more angry calls to customer service, and a reputation that is difficult to repair. For developers, it can mean that a "reference project" becomes a warning sign instead of a selling point.

How centralized systems fail tenants

The weakness of centralized systems is that one small problem becomes everyone's problem. Decentralized hubs also allow precise, apartment-level monitoring and control, preventing the hidden imbalances and temperature swings that plague centralized systems.

Imagine this: a circulation pump in the undercentral begins to underperform. The issue may be minor at first - a few tenants notice that their showers take longer to heat up. But because the system is centralized, the problem grows. Soon, entire wings of the building are waiting minutes for hot water. Complaints increase, and the operator is forced to launch an expensive investigation.

Or consider heating. In a centralized loop, balancing valves are supposed to distribute flow evenly. But if one is mis-set or clogged, apartments at the end of the line may be underheated. Families move into new apartments only to find their bedrooms stuck at 16°C in winter, while their neighbors complain of overheated living rooms. For the property manager, it is a nightmare: fixing the issue means rebalancing the whole system, disturbing multiple households, and still not being certain the comfort gap is solved.

Hot Water Delays

Long circulation loops mean tenants wait minutes for hot water, running taps and wasting energy

Uneven Heating

Some apartments overheat while others stay cold due to balancing issues in central loops

Building-Wide Failures

When central pumps or heat exchangers fail, the entire building feels it simultaneously

The cruel reality is that centralized systems often force operators to choose between comfort and cost.

Run circulation pumps harder

✓ Better comfort
▯ Massive energy waste

Slow circulation to save energy

✓ Lower bills
▯ Angry tenants waiting for hot water

It is a trade-off with no good outcome, and tenants are the ones who lose either way.

The ripple effect of tenant dissatisfaction

Once tenants begin to doubt the reliability of a building, it spreads beyond the technical issue itself.

- Seniors may start to feel insecure about whether their apartment will stay warm in winter.
- Families with children lose patience when hot water cuts out mid-shower.
- Students complain publicly online about the "bad heating system" in their dormitory.-

Every complaint chips away at the perceived value of the building. Even if the technical team eventually solves the problem, the trust is already damaged.

And trust, once lost, is hard to regain. A building can have the best environmental certifications in the world, but if tenants whisper that "the hot water never works" or "the heating is unreliable", that reputation sticks.

Why decentralization restores comfort

With Ekonod, every apartment is equipped with its own installation hub. That means:

- Hot water is prepared directly in the apartment → no circulation delays, no cold starts.
- Heating is controlled at the apartment level → no dependency on balancing loops across multiple risers.

If a fault does occur, it is contained to one apartment. The rest of the building continues to operate normally.

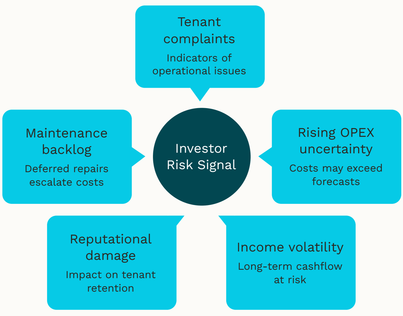
This is a fundamental change in tenant experience. Instead of being at the mercy of a building-wide system, each resident has reliable, predictable comfort that does not depend on whether their neighbors' systems are working.

Tenant perception = long-term value

For owners and developers, this is not just about keeping tenants happy. Comfort and trust directly affect the financial value of a building.

- Buildings with a reputation for poor heating or hot water are harder to let, and units sit vacant longer.
- Tenants in social housing or senior living are less willing to renew leases if they feel their basic needs aren't being met.

For investors, tenant complaints signal risk - they cast doubt on OPEX forecasts and on the long-term stability of income.



Ekonod protects against this by making comfort predictable. Instead of reactive service calls and firefighting complaints, operators can deliver quiet reliability. And quiet reliability is exactly what tenants value most.

Here’s what it means in practice

Centralized systems undermine trust because they connect everyone's comfort to a fragile, building-wide machine. When it fails, everyone suffers. Over time, this damages not only tenant satisfaction but also the financial value of the property.

Ekonod changes the game by localizing comfort to each apartment. Tenants get hot water and heating that work instantly and reliably, regardless of what happens elsewhere in the building. When comfort is stable, trust grows. And when trust grows, buildings hold their value and owners protect their reputation.

3H: Space Inefficiency and Architectural Constraints

In building projects, numbers dominate the conversation: cost per square meter, energy use per year, financing interest rates. But one of the most overlooked numbers is the space you lose to infrastructure. Every riser, every plant room, every dropped ceiling eats into usable space. And once that space is gone, it is gone forever.

> On drawings, this loss looks small. Shafts are neat rectangles in corners. Plant rooms are tidy boxes tucked away in basements. It doesn't feel like much. But multiply those rectangles by the number of floors, and multiply that lost space by the sales or rental value of your building, and suddenly the "invisible cost" becomes enormous. Centralized installation systems are especially guilty here. They don't just consume space – they also dictate how architects can (or can't) design, forcing layouts that are repetitive and suboptimal. The result: projects that cost more, return less, and feel less attractive to tenants.

How centralized systems swallow space

Let's make this concrete. In a centralized system, all heating, hot water, and ventilation must pass through large vertical risers and shafts that run the full height of the building. These are not small ducts you can hide in a wall. Each shaft often takes 1–2 m² per floor. In a ten-story building, that means 10–20 m² lost to a single shaft. Add three or four shafts for plumbing, ventilation, and electrics, and you're easily losing the floor area of an entire apartment.

1-2 m²	10-20 m²
Per Floor	Total Loss
Space consumed by each vertical shaft per floor	In a ten-story building from a single shaft

40,000 SEK	2M SEK
Value per m²	Revenue Lost
Saleable space in urban Sweden	From just 50m² consumed by infrastructure

At the bottom of the building, you don't escape the problem – it gets worse. Plant rooms have to be oversized to house circulation pumps, heat exchangers, balancing manifolds, and control equipment. These rooms take up prime space in basements or ground floors – exactly the areas that could otherwise be rented out as commercial units, storage, or parking.

And then there's the horizontal distribution problem. Centralized systems run long stretches of pipes and ducts through ceilings and floors. Ceilings must be lowered to hide them. Centralized layouts also require thicker walls and oversized risers, whereas decentralized hubs enable significantly thinner walls and slimmer shafts that reclaim valuable floor area across every level. That means apartments feel smaller, darker, and less premium than they should.

When you add all this together - vertical shafts, oversized plant rooms, lowered ceilings - the reality becomes clear: centralized systems don't just carry heating and water, they carry away your building's usable space.

The architectural straitjacket

The spatial penalty of centralization is bad enough, but it also creates a design straitjacket for architects.

Bathrooms must often be clustered together to keep risers short. Kitchens and wet zones must be positioned according to where the shaft allows, not where the design would naturally place them. Ceilings have to drop to conceal distribution runs.

> This forces repetitive apartment layouts. Instead of designing for flow, daylight, and tenant lifestyle, architects are forced to design for pipes. This is why so many residential projects feel "cookie cutter" it's not lack of creativity — it's the rigidity of centralized MEP.

The irony is that developers and architects spend enormous energy trying to differentiate their projects in a crowded market, but by locking into a centralized approach, they start the race with one hand tied behind their back.

The hidden financial multiplier

For developers, this isn't just an architectural issue - it's a financial one. Every square meter of lost space is revenue that disappears from the project's business case.

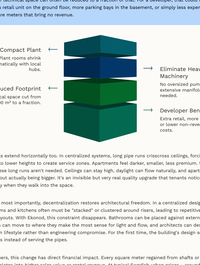
Let's run the math:

In urban Sweden, every saleable square meter is worth ~40,000 SEK (and often more in prime locations).

If centralized systems consume just 50 m² through shafts, plant rooms, and lowered ceilings, that's 2 million SEK in lost revenue.

And this loss is permanent. It doesn't appear in your capex budget as a line item. It only shows up in the reduced revenue potential of the finished building.

Now compare this to the baseline cost of installations. Conventional full-scope MEP - HVAC, plumbing, electrics, and undercentral - typically costs around 300,000 SEK per apartment. A 42-unit project in Stockholm, for example, came in at ~13 million SEK total, or 310,000 SEK per unit.

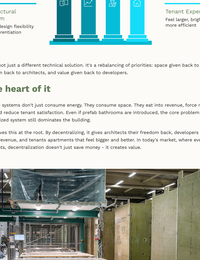


Prefab bathrooms alone barely change this figure. Why? Because they simplify logistics but do not alter the system topology. You still need the shafts. You still need the oversized plant room. You still suffer circulation losses. In other words: prefabrication at the bathroom level scratches the surface, but it doesn't solve the real problem.

> This is where decentralization has a multiplier effect. By eliminating or shrinking shafts and plant rooms, you not only reduce cost and complexity – you also unlock additional revenue. In many cases, the value of the freed space equals or exceeds the installation savings. You get a double win: lower lifecycle cost and higher project revenue.

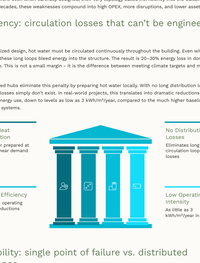
The Ekonod alternative: space turned into value

Ekonod takes the problem of wasted space and turns it into an opportunity. Instead of relying on one big centralized system that feeds the entire building, Ekonod decentralizes installations to the apartment level. Each unit receives its own compact, factory-assembled hub – a self-contained module that integrates heating, hot water, ventilation, and smart control in one place.



The shift is subtle but powerful. Instead of long risers snaking through the building, pipes now only need to travel a few meters within each apartment. This means no more oversized shafts eating up floor space across every story. A single shaft that once consumed 1–2 m² per floor can disappear completely, returning that space to the architect to use for real living area. Over 10 or 20 floors, that reclaimed space is the equivalent of an entire apartment – space that generates revenue instead of swallowing it.

> At the bottom of the building, the savings are just as clear. Plant rooms shrink dramatically. Because Ekonod's hubs prepare hot water and regulate flow locally, there's no need for the heavy machinery of a centralized system: no oversized circulation pumps running day and night, no balancing manifolds stretching across the basement, no labyrinth of distribution pipework. What used to require 50 or 100 m² of technical space can often be reduced to a fraction of that. For a developer, that could mean an extra retail unit on the ground floor, more parking bays in the basement, or simply less expensive square meters that bring no revenue.



The benefits extend horizontally too. In centralized systems, long pipe runs crisscross ceilings, forcing architects to lower heights to create service zones. Apartments feel darker, smaller, less premium. With Ekonod, these long runs aren't needed. Ceilings can stay high, daylight can flow naturally, and apartments feel bigger without actually being bigger. It's an invisible but very real quality upgrade that tenants notice immediately when they walk into the space.

Perhaps most importantly, decentralization restores architectural freedom. In a centralized design, bathrooms and kitchens often must be "stacked" or clustered around risers, leading to repetitive, cookie-cutter layouts. With Ekonod, this constraint disappears. Bathrooms can be placed against external walls, kitchens can move to where they make the most sense for light and flow, and architects can design layouts based on lifestyle rather than engineering compromise. For the first time, the building's design serves the residents instead of serving the pipes.

For developers, this change has direct financial impact. Every square meter regained from shafts or plant rooms translates into higher sales value or rental revenue. At typical Swedish urban prices – around 40,000 SEK per m² – even reclaiming 50 m² can unlock 2 million SEK in additional revenue. That's more than enough to offset a major share of the installation cost itself. For architects, it means more design flexibility and the ability to differentiate projects in a crowded market. For tenants, it means apartments that are not only more efficient but also feel larger, brighter, and better thought through.

Ekonod is not just a different technical solution. It's a rebalancing of priorities: space given back to people, design given back to architects, and value given back to developers.

At the heart of it

Centralized systems don't just consume energy. They consume space. They eat into revenue, force repetitive layouts, and reduce tenant satisfaction. Even if prefab bathrooms are introduced, the core problem remains: the centralized system still dominates the building.

Ekonod solves this at the root. By decentralizing, it gives architects their freedom back, developers millions in reclaimed revenue, and tenants apartments that feel bigger and better. In today's market, where every square meter counts, decentralization doesn't just save money - it creates value.

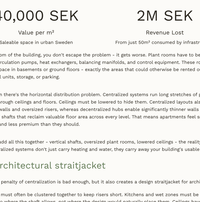
Energy and performance penalties of centralization

Centralized systems don't just waste space - they also waste energy, undermine resilience, and compromise tenant comfort. Even when carefully designed, their very topology bakes inefficiency into the building from day one. Over decades, these weaknesses compound into high OPEX, more disruptions, and lower asset value.

Efficiency: circulation losses that can't be engineered away

In a centralized design, hot water must be circulated continuously throughout the building. Even with good insulation, these long loops bleed energy into the structure. The result is 20–30% energy loss in domestic hot water alone. This is not a small margin - it is the difference between meeting climate targets and missing them.

Decentralized hubs eliminate this penalty by preparing hot water locally. With no long distribution loops, circulation losses simply don't exist. In real-world projects, this translates into dramatic reductions in operating energy use, down to levels as low as 3 kWh/m²/year, compared to the much higher baseline of centralized systems.



Reliability: single point of failure vs. distributed resilience

A centralized system depends on a handful of large components: one or two air handling units, one big undercentral, a set of oversized pumps. When one of these fails, the entire building feels it.

With decentralized systems, the risk is spread. Each apartment has its own hub. If one unit develops a fault, it affects only that apartment. Tenants in neighboring units remain comfortable, the building continues to function, and maintenance crews can target the issue quickly without disrupting everyone. This resilience by design is one of decentralization's biggest advantages.

Lifecycle economics: the OPEX trap

From a cost perspective, centralized inefficiency creates a long-term trap for owners. Installation costs (CAPEX) may appear predictable at first, but the real burden is OPEX over decades. Constant circulation pumping, balancing, and heat losses drive up energy bills year after year. When energy prices spike – as they have repeatedly in Sweden and across Europe - the total cost of ownership balloons.

And when the system inevitably needs retrofitting mid-life, the disruption is severe. Replacing a central heat exchanger or ventilation unit is a building-wide event. Tenants are inconvenienced, walls and ceilings may need to be opened, and costs pile up.

By contrast, decentralized hubs tie capex and opex together in a stable, predictable way. Each module is designed for long life, is easy to service, and can be replaced independently without disrupting the rest of the building. For owners, this means cost clarity at the start, cost stability over time, and far lower retrofit disruption.

Tenant experience: comfort without compromise

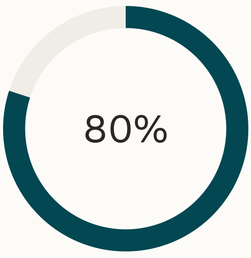
Tenants rarely think about MEP systems - until they don't work. In centralized systems, comfort often suffers: long waits for hot water, uneven heating between apartments, noisy circulation equipment. These issues not only frustrate residents, they erode the building's reputation and make it harder to rent or sell units at a premium.

Decentralized hubs reverse this. Hot water is instant, heating is consistent, and ventilation is individually controlled. Each apartment becomes its own comfort zone, independent of what neighbors are doing. For tenants, this isn't a technical nuance - it's the difference between frustration and satisfaction.

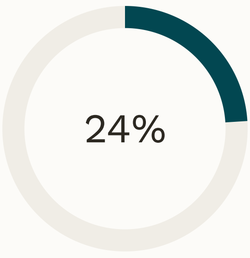
3I: "Not Common in Sweden" ≠ Unproven

Whenever a new concept challenges industry habits, the first reaction is rarely technical - it's cultural. With decentralized, apartment-based installations, one of the most common objections we hear in Sweden is: "But this isn't how we usually do it here." The assumption is that because it's not yet mainstream locally, it must be risky. But this is a misconception.

The truth is that apartment-level installations are already mainstream in large parts of Europe. In the Netherlands, over 80% of apartments use decentralized hubs for heating, ventilation, and hot water. In Germany, the figure is roughly one in four homes (24%), and rising fast as energy performance standards tighten. Far from being experimental, this approach has decades of proven track record in some of Europe's most advanced housing markets.



Of apartments in the Netherlands use decentralized hubs



Of German homes use apartment-level installations

Years of proven track record in advanced European markets

So why does it still feel "new" in Sweden? The answer isn't physics - it's process familiarity. The Swedish construction industry has long optimized itself around centralized models: one big undercentral, long distribution loops, bathrooms stacked for risers. General contractors, consultants, and installers all know this playbook by heart. Shifting to apartment-level modules feels like a change of language.

The Physics Are Identical

- Water is heated
- Air is exchanged
- Energy is delivered where needed

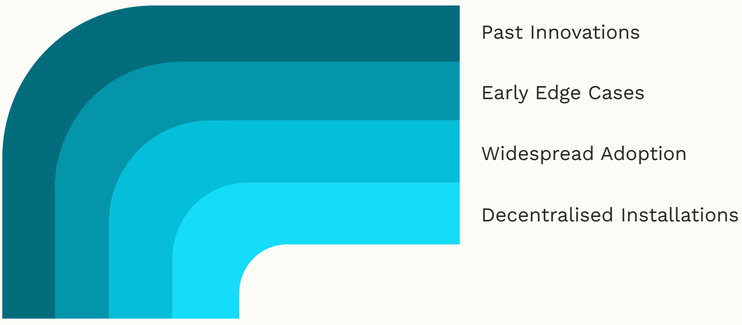
Only the Location Changes

- Centrally in one big room
- Or locally in compact hubs

But once you look at the fundamentals, the barriers fall away. The physics are identical: water is heated, air is exchanged, and energy is delivered to where it's needed. The only difference is where the work happens - centrally in one big room, or locally in compact hubs. From a tenant's perspective, decentralized hubs are actually simpler: hot water arrives instantly, heating is stable, and comfort is independent of neighbors. From a developer's perspective, the system is more predictable, with lower risk of building-wide failures and costly retrofits.

Why "not common" is the wrong risk lens

It's worth remembering that many things now considered standard in Swedish housing were once seen as "too new." Timber high-rises, prefabricated bathroom pods, triple glazing - all of these were innovations that started as edge cases before becoming the norm. Decentralized installations are on the same trajectory.



The fact that they are already proven at scale in markets like Germany and the Netherlands means that Sweden isn't facing an untested experiment. What Sweden is facing is a lag in adoption. The technical risk is negligible; the real challenge is cultural inertia and getting design teams, consultants, and contractors comfortable with a new process.

The upside of early adoption

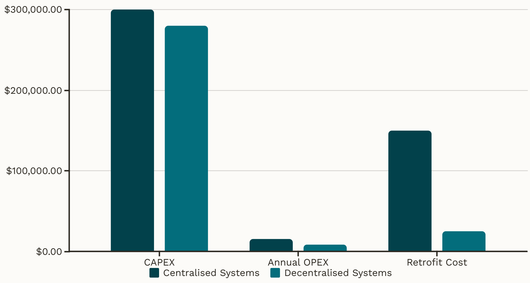
> For developers, this presents an opportunity. Being among the first to adopt decentralized systems in Sweden means delivering something tenants, municipalities, and investors already value: lower CO_2 emissions, lower lifecycle costs, and higher comfort. It also positions projects as forward-thinking and aligned with European best practice.
>
> Municipalities increasingly expect housing projects to demonstrate climate alignment. Investors are scrutinizing lifecycle performance more closely than ever. Tenants want comfort, reliability, and transparency in their energy use. In all three areas, decentralized systems are not just competitive - they are superior.

Bottom line

> The objection that decentralized systems are "not common in Sweden" confuses **novelty with risk**. This is not an untested technology; it is a proven standard across much of Europe. The barrier in Sweden is not physics - it is habit. For developers and owners willing to break with convention, decentralization offers a way to leapfrog outdated practices and align immediately with the future of European housing.

3J: Financial Risk and Unpredictability

In construction, cost predictability is everything. Developers and investors need to know not just how much a project will cost to build, but how much it will cost to run over decades. Tenants expect stable operating costs. Municipalities demand lifecycle CO_2 accountability. The problem with centralized installation systems is that they undermine predictability at every level. They look efficient in year one but become unpredictable and expensive over the life of the building.



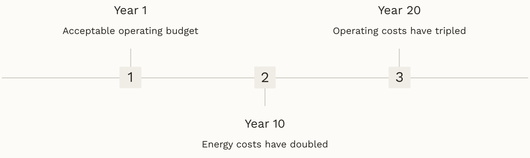
The CAPEX baseline: already expensive

Let's start with the upfront numbers. In Sweden, conventional full-scope installations - HVAC, plumbing, electrics, and undercentral - consistently land around 300,000 SEK per apartment. A 42-unit building in Stockholm, for example, came in at ≈13 million SEK total, or 310,000 SEK per unit.

Prefabricated bathrooms, often presented as a "cost saver," barely move this figure. Why? Because they don't change the system topology. Because the hubs are pre-engineered and pre-costed, developers receive a known, validated installation cost profile from day one - eliminating the guesswork that plagues centralized bids. You still need the big undercentral, the circulation pumps, the balancing manifolds, and the shafts. Prefab pods may make site logistics easier, but they leave the financial and lifecycle risks of centralization intact.

The OPEX trap: decades of wasted energy

The bigger financial risk comes after handover. Centralized systems lock owners into decades of higher operating costs. Long hot-water circulation loops bleed energy continuously, causing 20–30% distribution losses. Pumps must run day and night. Balancing and re-balancing becomes a recurring maintenance burden.

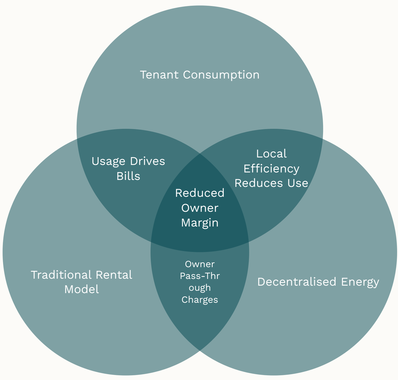


When energy prices rise - as they have across Europe in recent years - the cost of those systemic losses compounds. What looked like an acceptable operating budget in year one can double or triple by year 10 or 20. And because the system is centralized, there is no way to "trim the fat" without major retrofits.

Decentralized systems avoid this trap. By preparing hot water locally, they eliminate circulation losses entirely. OPEX remains low and stable, regardless of how energy markets move. For owners, this means predictable operating costs instead of open-ended exposure.

Revenue vs. cost: the landlord's dilemma

In rental models, many property owners pass energy costs through to tenants with a margin. On the surface, that seems like protection: if tenants use more, owners bill more. But decentralization flips the dynamic. If tenants consume less - thanks to efficient local hubs - the owner's margin on energy may shrink.



This looks like a downside until you consider the bigger picture. Yes, the immediate revenue skim may drop, but so do the costs owed to district heating companies or utilities. More importantly, the value of the building rises because operating costs are lower, comfort is higher, and ESG alignment is stronger. Tenants who see direct, transparent control over their own consumption are happier and stay longer. For institutional investors, a building with low and predictable OPEX is far more attractive than one with high running costs and tenant complaints.

Retrofit disruption: the mid-life shock

Every centralized system carries a hidden time bomb: the mid-life retrofit. Pumps wear out, heat exchangers corrode, and oversized ventilation units eventually need replacing. When that happens, the impact is building-wide. Tenants lose hot water or heating, walls and ceilings must be opened, and the retrofit bill can easily run into the millions.

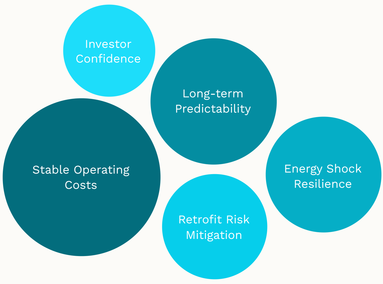
With decentralized hubs, the risk is distributed. Each apartment is its own self-contained system. If one unit fails, it affects only that tenant. Replacement is a small, predictable service event - not a building-wide crisis. For owners, this transforms retrofit from an unpredictable, lumpy capital shock into a smooth, manageable operating cost.

Lifecycle cost clarity: coupling CAPEX and OPEX

Perhaps the greatest advantage of decentralization is that it couples upfront investment with predictable lifecycle performance. With centralized systems, CAPEX is high and OPEX is volatile. With decentralized systems, CAPEX is competitive and OPEX is stable.

The result is true cost clarity:

- Developers know what the installation will cost upfront.
- Owners know operating costs will stay low over decades.
- Investors know the building's financial model won't be upended by energy shocks or retrofit crises.



Centralized systems are a financial illusion. They look "safe" because they're familiar, but in reality they:

- Demand ≈300,000 SEK per apartment upfront.
- Lock owners into 20–30% energy losses for decades.
- Expose projects to volatile energy costs.
- Guarantee disruptive, costly retrofits mid-life.

Ekonod decentralization breaks this cycle. It delivers stable CAPEX, eliminates circulation losses, shields owners from OPEX escalation, and turns unpredictable retrofits into simple service calls. For developers, this means a project with a stable cost curve. For owners and investors, it means a building that holds its value over time instead of eroding it.

nordnest

3K: Why "Prefab Bathroom" Isn't Enough

At first glance, prefabricated bathrooms seem like a step toward modernization. A pod is delivered, lifted into place, and saves time for carpenters, tilers, and plumbers on site. For many contractors, this feels like progress: fewer headaches with coordination, fewer late-night tiling schedules, fewer wet-room inspection disputes.

But prefabricated bathrooms, when delivered into an otherwise centralized system, don't touch the core problem. They improve logistics, but they don't change the topology of the installation.

The result:

Energy waste continues.

Centralized circulation still runs through the building, bleeding 20–30% of hot-water energy into losses. The pod itself doesn't eliminate the circulation penalty.

Trade conflicts remain.

Even if the bathroom is installed in one lift, other trades still crowd ceilings, risers, and plant rooms. Electricians, plumbers, and HVAC teams still collide where distribution has to cross.

Failures spread.

If a central pump, heat exchanger, or riser goes wrong, the entire building still feels it. A prefab pod does not localize risk - one misconnected terminal can still cut performance to 25% of capacity, as Villa Fehr showed.

Commissioning stays complicated.

Each central loop must be pressure-tested, balanced, and inspected across the whole building. Commissioning takes time, introduces errors, and often results in the very pressure-drop investigations that cost 50–100,000 SEK each.

In other words, a prefab bathroom is a logistics fix, not a systemic fix. It may deliver a cleaner, faster bathroom, but it leaves behind the very risks that drain money and time over the life of the building.

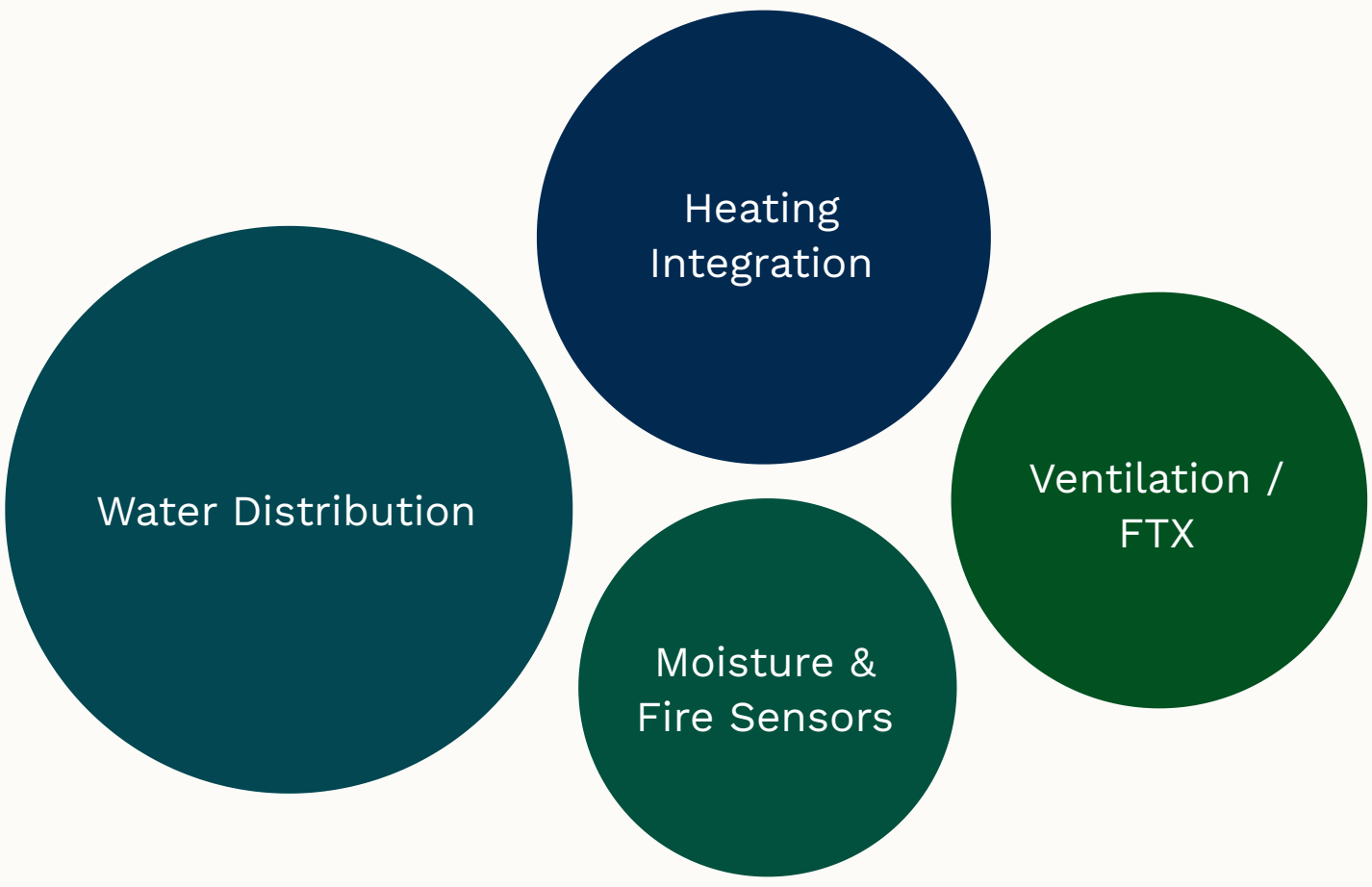
Why Ekonod uses the bathroom as the installation platform

Ekonod turns the logic on its head. Instead of treating the bathroom as an isolated pod, we use it as the integration point for the entire apartment's installations.

Ekonod hubs are also significantly lighter - typically around one-third the weight of a traditional prefab pod - reducing structural load, easing logistics, and opening up entirely new layout possibilities.

Inside each Ekonod hub, not just tiles and fixtures are factory-assembled, but also:

- Water distribution
- Heating integration
- Ventilation/FTX unit
- Smart sensors for moisture and fire safety



By doing this, the bathroom becomes the natural "station" for all key building services - pre-engineered, pre-tested, and delivered as a complete installation package. Complexity is removed from the site and shifted upstream into the factory, where quality is controlled.

The bottom line

Prefab solutions:

- Solve logistics.
- Reduce tiling hassle.

Ekonod solutions:

- Solve the system.
- Reduce lifecycle cost, energy waste, and systemic risk.

That is why Ekonod is not just "a bathroom module." It is a decentralized installation platform that moves engineering upstream, decomposes risk to the apartment level, and collapses distribution losses by shortening runs and lowering supply temperatures.

Where traditional systems centralize risk, Ekonod decomposes it. Where prefab pods simply repackage site work, Ekonod redesigns the entire building services model. The result is not just a faster handover, but a building that works better - day one and year twenty.

3L: Tenant Comfort and Experience

At the end of the day, buildings are not built for pipes or pumps - they are built for people. And yet in centralized systems, tenants are often the ones who pay the price for technical compromises.

The centralized tenant experience: frustration baked in

In a traditional, centralized setup, comfort is fragile because everything depends on a few large systems. If circulation loops are long, tenants wait for hot water - running taps and wasting energy. If balancing is off, some apartments overheat while others stay cold. If a central pump or heat exchanger fails, the entire building feels it.

The decentralized tenant experience: comfort by design

Ekonod's decentralized model flips this logic. Each apartment receives its own compact, factory-assembled hub - a self-contained comfort engine. Hot water is prepared locally, so it arrives instantly at the tap, without waiting for a circulation loop. Heating and ventilation are controlled per apartment, not dictated by a central plant.

Instant Hot Water

Hot water is prepared locally, ensuring it arrives instantly at the tap without waiting for circulation loops.

Individual Control

Heating and ventilation are controlled per apartment, allowing tenants to dictate their own comfort settings.

Resilience & Isolation

If one hub develops a fault, it affects only that unit, not the entire building, minimizing disruption for neighbors.

The effect is that each home becomes its own independent comfort zone. If one hub develops a fault, it affects only that unit - not the entire building. Service teams can target the problem directly without disrupting neighbors. Tenants feel secure knowing their comfort doesn't depend on whether a distant pump is balanced correctly or whether their neighbors are showering at the same time.

Why this matters for developers and owners

Tenant comfort is not just a "soft" outcome. It has direct financial and reputational consequences. A building that tenants describe as "always cold" or "slow to get hot water" becomes harder to rent or sell at a premium. Complaints translate into management costs and reputational damage.

By contrast, a building where tenants consistently experience comfort, reliability, and independence builds quiet value. Tenants stay longer. Vacancy rates fall. Word of mouth improves. And investors increasingly see tenant satisfaction scores as part of ESG reporting and long-term asset valuation.

The reality is simple

Centralized Systems:

- Comfort vulnerable
- Complaints inevitable
- Dependent on complex central systems
- Risk of building-wide disruptions

Decentralized Hubs:

- Comfort predictable
- Local and resilient
- Independent apartment control
- Minimal disruption upon fault

Centralized systems leave comfort vulnerable and complaints inevitable. Decentralized hubs make comfort predictable, local, and resilient. For tenants, this means homes that feel larger, brighter, and better thought through. For developers and owners, it means fewer complaints, lower management costs, and stronger long-term value.

> Comfort is not a side effect of good engineering. With Ekonod, it is the design principle.

3M: Process and Commissioning Clarity

In traditional projects, the design-and-build process often looks neat on paper: consultants design, contractors build, and commissioning teams verify. But anyone who has stood on a Swedish construction site knows the reality is very different. Centralized systems create **layers of complexity** that explode during commissioning, when time is tight, deadlines are looming, and every unresolved issue becomes expensive.

1

The problem with centralized commissioning

A centralized MEP system means:

Long loops to test and balance. Every meter of pipe must be pressure-tested, flushed, balanced, and certified. In practice, this rarely works first time. Loops are out of balance, air pockets remain, pressure drops emerge.

Costly investigations. Even a minor imbalance can trigger a full-blown investigation. Pressure-drop investigations routinely cost 50,000–100,000 SEK each. Multiply that across a large building, and commissioning becomes a hidden budget line.

"Who owns what?" disputes. Centralization blurs package boundaries. HVAC contractors blame plumbers; plumbers blame electricians; inspectors point to consultants. Arguments over responsibility delay handover and create contractual churn.

Risk concentrated in time. Because design is often finalized late, commissioning teams face a compressed schedule. Fixes happen in panic mode, with costly overtime and change orders.

In other words, centralized commissioning doesn't just test the system - it tests relationships, budgets, and patience.

2

The decentralized alternative: simpler by design

Ekonod's decentralized hubs radically simplify this stage of the process. Each hub is pre-engineered and factory-tested before it arrives on site. Water, ventilation, heating, and sensors are integrated into a single unit, assembled under controlled conditions.

That means commissioning on site shifts from debugging a complex central loop to simply verifying connections:

- No long distribution loops to balance.
- No oversized plant rooms with multiple subcontractors colliding.
- No unclear scope disputes, since the hub arrives as a complete, tested system.

Inspection becomes a straightforward confirmation step, not a detective mission.

The hubs' digital interfaces (Modbus and Matter-ready) allow automated verification and apartment-level diagnostics, replacing much of the manual, building-wide fault tracing required in centralized commissioning.

Because complexity is moved upstream into the factory, site commissioning is no longer about fixing errors but about **confirming performance**. This not only shortens the commissioning period but also reduces the risk of hidden defects that show up months later, after tenants have moved in.

The benefit for owners and developers

- **Shorter time to handover.** Less rework, fewer disputes, faster inspections.
- **Lower hidden costs.** No need to budget for multiple 100k SEK investigations.
- **Predictable quality.** Every apartment's hub has already been tested under factory conditions.
- **Smoother relationships.** Fewer cross-trade conflicts mean less contractual churn and a calmer site environment.

In practice, this means projects reach completion dates with less stress, fewer defects, and stronger confidence that the building will perform as promised.

Centralized systems push complexity and risk into the worst possible stage - late in the project, when time and budget are exhausted.

Ekonod reverses this by shifting complexity upstream, into a controlled factory environment.

For developers, this means commissioning that is predictable, fast, and inexpensive. For tenants, it means moving into a building that works from day one. And for everyone involved, it means fewer sleepless nights on site.