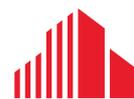


IS A
SMART BUILDING
A SUSTAINABLE
BUILDING?



**CUSHMAN &
WAKEFIELD**

INTRODUCTION

THE DISCOVERY AND HARNESSING OF ENERGY HAS PLAYED A CRUCIAL ROLE IN THE DEVELOPMENT OF HUMAN HISTORY. WE NEED ENERGY TO DO ANYTHING IN LIFE. IN ITS PUREST FORM, BOTH BIOLOGICAL AND PHYSICAL SYSTEMS DEPEND ON ENERGY TO CARRY OUT BOTH SIMPLE AND COMPLEX TASKS.

In the industrialized world, most of the economic output we generate takes place indoors therefore it is clear our built world is critical for our ability to thrive. However, it is right to recognize that a lot of energy is spent in the construction of a building – bringing together the concrete, glass, steel, from distant shores to be manipulated into shape via heavy machinery. It's also important to be sensitive that around 40% of the carbon impact of a building comes from the day-to-day operation – the heating, cooling, air purification, lighting, IT infrastructure, lifts and other key elements.

Globally, we require cheap, reliable and plentiful energy and there is an increasing importance that this energy is carbon efficient, namely to drive us forwards to a net zero planet.

There is a need to tackle the duality of making our built environment more sustainable all while considering the impact on affordability and resilience. Buildings provide shelter and safety and are key for our prosperity, even though we know their construction and operations have a negative planetary environmental impact. Therefore, is it possible to enable more sustainable communities which would support our growth at a lower cost to the planet?

TO ADDRESS THIS QUESTION, THERE ARE THREE FUNDAMENTALS WE MUST AGREE UPON –

WE NEED TO MAKE OUR BUILDINGS MORE EFFICIENT

The built environment had a major role to play in achieving the goals first conceived at the Paris Climate Accord in 2015: keep post-industrial global warming to less than 2 degrees, preferably to 1.5 degrees. We have an opportunity to use technology and new processes to improve the efficiency of our buildings without compromising on the need for a cost-effective building operating model.

There's a great deal we can and must do to make sure the embodied carbon (60% of the building's impact) is reduced - reusing elements and prioritizing local and low-impact materials, while also designing for maximum operational efficiency.

However, to fully optimize the carbon impact of a building we need to deploy technology to reduce in-life energy consumption.

WE SHOULD USE TECHNOLOGY TO HELP OUR BUILDINGS BECOME MORE SUSTAINABLE

The internet has matured from a communications tool to a controls network. New software has allowed us to control building systems virtually and to understand and interpret the way in which buildings work.

New internet-enabled devices, commonly referred to as the Internet of Things (IoT), allow us to use data to make more informed decisions. A strong data infrastructure in the building is critical and is optimized by software and algorithms. The most important aspect is that the right software can analyze data, find patterns, predict outcomes, and find ways to improve the performance of building systems.

TECHNOLOGY IS NOT A SILVER BULLET

Technology is one part of the solution and is a key driver in terms of both measuring and implementing effective sustainability solutions. One of the challenges is the gradual greening of the grid. Deploying technology in a building is an act of spending carbon today (the carbon embodied in sensors, lighting arrays, networks etc.) to save carbon tomorrow. Right now, the payback is good and, if we green the grid at the pace we expect to, then it's clear that deploying technology to make building more efficient is not only beneficial, but a critical part of us achieving our climate targets.



SUSTAINABLE & SMART BUILDINGS

A sustainable, or green building, according to the World Green Building Council, is a building that in its design, construction, or operation, reduces or eliminates negative impacts and can create positive impacts on our climate and natural environment.

ACCORDING TO WIREScore, A SMART BUILDING IS ONE THAT DELIVERS OUTSTANDING OUTCOMES FOR ALL USERS, THROUGH DIGITAL TECHNOLOGY, TO EXCEED THEIR EVOLVING EXPECTATIONS. THE FOUR OUTCOMES THAT A SMART BUILDING MUST DELIVER ARE:

-  SUSTAINABLE
-  FUTURE-PROOFED
-  COST-EFFICIENT
-  AN INSPIRATIONAL EXPERIENCE

The technology of a smart building can enable sustainable improvements in buildings far more swiftly than without. We know that the technology in place improves the operational performance, or at least it creates the framework to successfully deliver.

Landlords need to adopt multiple strategies to decarbonize their assets and, as such, the appropriate use of technology is a must. Developing a smart building allows landlords to use technology such as IoT, analytics, and artificial intelligence to measure, analyze and optimize the building's systems and, in turn, performance.

A STEP BY STEP PROCESS TO ACHIEVE THE OPTIMIZATION OF AN ASSET IS CALLED FOR.



TO DEMONSTRATE THIS IN THE **'REAL WORLD'**
THE FOLLOWING USE CASES HAVE CLEARLY
BEEN SUCCESSFULLY ESTABLISHED:



The landlord has delivered a solution for tenants and building operators to track the building's energy consumption and report against sustainability targets.



The landlord has delivered a solution for building operators to optimize the ongoing energy performance of the building.



The landlord has enabled tenants to extend the energy optimization program into their own space, and track its success in real time.



The landlord has delivered a solution for tenants and building operators to track the building's water consumption and identify areas for improvements.



The landlord has enabled tenants to integrate water data into their own workplace sustainability reporting.



The landlord has delivered solutions which inform tenants of the building's sustainability objectives and engage them in reducing the building's carbon footprint.



The landlord has enabled tenants to integrate the solution into their own workplace solutions and extend it to include their own space

CONCLUSION

THE QUESTION POSED BY THIS SHORT PAPER WAS 'IS A SMART BUILDING A SUSTAINABLE BUILDING' AND AS WITH MOST THINGS IN LIFE THE ANSWER IS 'IT DEPENDS.' CERTAINLY, A LANDLORD FOCUSED ON SUSTAINABILITY MUST RECOGNIZE THE POSITIVE BENEFITS OF EMBEDDED SMART TECHNOLOGY.

The carbon footprint of a landlord is heavily linked to their standing portfolio. Most buildings owned by an entity today will still be owned by the same in 10 years' time. The operating model must therefore be right for the short, medium, and longer term. As we've discussed, technology can be a great enabler for improving the efficiency of our built environment whilst at the same time we need to balance the inherent environmental cost it brings.

The selection and implementation of technology will differ by building type use case, although of course there are consistencies when looking to achieve the notion of a 'sustainable building.' A strong foundation is required for buildings to maximize the sustainability outcomes they aspire to achieve. Buildings set to benefit from the analytics smart solutions can bring must have a core platform, typically the building management systems that can aggregate information as well as predict, direct and control required changes. The benefits of analyzing and embedding change within a building is limited to the data that building provides. Far more powerful still, is to link the data to broader datasets, either sharing with a broader peer group or enhancing with open-source datasets.

It is always key to start at the end. What outcomes would define success? Sustainability isn't the only criteria of success and the other aspects of a smart building need to be accepted and balanced alongside the primary considerations.

So, is a smart building a sustainable building? The answer would have to be no. However, if we rephrase the question as 'can a building be sustainable without being smart' the answer would also be no. The best way to create, deliver and operate as sustainable as possibly is through embracing what smart technology can deliver.



CASE STUDY

THE HAMMERBROOKLYN.DIGITAL PAVILLON IS A 7,300 SQ METER INNOVATION HUB AND SMART OFFICE BUILDING IN HAMBURG (GERMANY), WHICH WAS DELIVERED TO ITS TENANT “THE FACTORY HAMMERBROOKLYN” IN MID-2021. THE BUILDING IS THE UPCYCLED, FORMER EXPO PAVILION WHICH, BY THE REUSE OF MATERIALS, REDUCED ITS EMBODIED CARBON BY A SIGNIFICANT AMOUNT. THE BUILDING SETS NEW STANDARDS THROUGH THE IMPLEMENTATION OF:



SMART TECHNOLOGY



SETUP AS AN ALL-ELECTRIC BUILDING



CARBON NEUTRALITY IN DAY-TO-DAY OPERATION

The smart building concept is largely built around sustainability while maximizing value for all stakeholders - especially the building users. Technologically, the Hammerbrooklyn. Digital Pavillon is a modern state-of-the-art office building, comprising technical equipment such as approximately 3,000 multi sensors which are connected to a central platform where all data is collected, stored and made available. This unique infrastructure works as an enabler for various use cases and provides maximum flexibility for reacting to changing tenant and user needs, now and into the future. Today, user-specific dashboards provide relevant information to both tenant and landlord via a building app. This allows the user to control the building via a smartphone (desk booking, room control, access etc.)



The building's energy monitoring platform and intelligent controls make it an exceptionally energy efficient building, out-performing its peers by 45%. Based on this concept, the Hammerbrooklyn.Digital Pavillon is a blueprint for sustainable and smart buildings and received SmartScore platinum level in 2021.

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