
circular

closed-loop economy
in cities and real estate

think
co

×

JW+A SKANSKA revive SYSTEM3E

think
co

www.thinkco.pl

circular

closed-loop economy
in cities and real estate

Tomasz Bojęć
Przemysław Chimczak-Bratkowski
Dominik Różewicz

Karolina Bondar
Agata Kucharska
Kaja Kokoszka
Natalia Popławska

Graphic design:
Karol Koszniec

Translated by:
Wojciech Góralczyk

Warszawa 2023

strategic partners:

JW+A **SKANSKA** **revive** **SYSTEM3E**

table of contents



Circular Economy 101	12
what is a circular economy	14



legislation	22
the legal situation of Circular Economy	24



the second life of buildings	34
adaptations	36
designed for the future	46



circular buildings	56
circular from design to use	58
building materials and furnishings	64
strategic partners	76
notes	78
about us	80



introduction



Tomasz Bojć
Managing Partner
ThinkCo



Przemysław Chimczak-Bratkowski
Managing Partner
ThinkCo



Dominik Różewicz
Lead Analyst
ThinkCo

Anything to keep up with the Joneses – that’s probably the most apt description of our current economy, in which we consume 1.6 times more resources than Earth’s regenerative abilities allow. Living above our means is an incredibly dangerous game in which the price we end up paying for today’s comfort and lower prices might be the security and well-being of future generations. More and more people are recognizing this fact, and there is growing public awareness of the importance of sustainability, which results in legislative and business pressure to implement responsible solutions. And circular economy, to which this report is dedicated, is an integral part of sustainable development.

In the first part of this publication, we introduce the ABC of circularity. Then we embark on a journey through the current and future solutions being implemented in cities. We also briefly touch on requirements imposed by the European Union. Finally, we break down various issues related to circular economy in the real estate market. We hope that reading our publication will make you realize just how multifaceted this issue is, and how it can

affect every stage of implementing an investment, as well as the subsequent use and even (most importantly?) demolition of a building. We write about adapting existing buildings and designing new ones in a way that they can be easily transformed or deconstructed to benefit subsequent construction. Design is key, but a thoughtful construction process and knowing where to get the right materials is no less crucial. Once a circular building is designed and built, there still remains the most important aspect: operation. Here, innovation comes to the rescue, allowing us to both limit resource consumption, and prolong the life of a building, keeping it in good shape.

We have only one Earth, so let’s leave something behind for those who come after us - especially since now, we have some ideas on how to do it. Enjoy the read!

source: QUENF3c0, Unsplash

key findings



CLOSED-LOOP ECONOMY

What?

- The aim of a closed-loop economy (CLE), also known as a circular economy, is preserving the value of goods, components, and materials, and reducing waste and pollution.

Why?

- We consume 1.6 times more resources than the regenerative capabilities of Earth allow. The circularity gap, i.e. the percentage of resources that remain outside of the closed loop, is 92.8% globally, and 89.9% in Poland.
- The main motivation behind implementing CLE is softening the impact of climate change and increasing biodiversity, while simultaneously meeting the needs of all the citizens of our planet.
- Sustainable development can be economically profitable. It is estimated that implementing a closed-loop economy in Europe by 2030 could result in the GDP growing by 7%.

How?

- Using renewable energy and preserving natural resources.
- Keeping raw materials in circulation without losing their original qualities through extended use of products, repairs and renovations, recycling, upcycling, and processing.
- Switching to a CLE model requires engagement, skills, knowledge, favorable social attitudes, reorganizing business models, financing, and adjusting legislation.



A NEW CIRCULAR ECONOMY ACTION PLAN (CEAP)

- The key feature of the European Green Deal is the new circular economy action plan (CEAP), which encompasses 35 actions geared towards doubling the reusability rate of materials by the end of the decade.
- According to the European Commission's estimates, implementing the principles of CE could grow the union's GDP by an additional 0.5% by 2030, creating ca. 700 thousand new jobs. It is also meant to allow companies to improve their profitability and competitiveness by lowering the risk resulting from the vacillation of resource prices.
- CEAP lists seven key value chains of products, one of them being construction. The planned Strategy for a Sustainable Built Environment is meant to ensure cohesion in actions aimed at improving sustainability in construction.



THE RENOVATION WAVE PRESENTS BUILDING OWNERS WITH SPECIFIC REQUIREMENTS

- The goal of the Renovation Wave (RW) is implementing energy-saving and resource-saving renovations of buildings. The program is meant to reduce energy poverty, create numerous jobs, and stimulate the development of technology.
- One of the chief demands made of building owners is the requirement to possess energy performance certification for all buildings offered for rent or sale. The certificate is valid for 10 years for class A, B, or C buildings, and for 5 years for all other buildings.
- The Renovation Wave is also aimed at standardizing terminology by introducing the definition of thorough renovation, i.e. a renovation that results in the building becoming nearly zero-energy (by 2030) or fully emission-free (from 2030).



REAL ESTATE ADAPTATIONS AND CONVERSIONS

- There are three basic strategies of more efficient building use that are set to be particularly frequently implemented in the coming years. The adaptation strategy consists of changing the property's function, which entails transforming its structure and furnishings. The expansive strategy consists of making a broader use of the property by modernizing and adding new space to existing buildings in a creative way. In the proactive strategy, the property is in use, and we are taking preventive measures meant to avert a reduction in functionality.
- Another type of adaptation is a conversion, which entails a complete change of the building's function. Adapting an existing structure to new uses presents many legal and construction-related challenges. However, we can expect conversions to grow in popularity due to the high price of real estate, low availability of land, and environmental limitations.



CIRCULAR BUILDINGS ARE THE FOUNDATION OF SUSTAINABLE DEVELOPMENT

- On a global scale, the construction sector is responsible for 35% of energy consumption, 38% of CO2 energy-related emissions, and 50% of resource use, and in the EU alone, construction and demolition waste amount for ca. 30% of all waste.
- We cannot make economies more circular without introducing far-reaching changes to the real estate sector on a fundamental level, particularly in terms of: sourcing materials, transportation, demolition, processing, and reusing construction waste.
- Circular buildings are objects that are designed, used and reused without unnecessary resource depletion, polluting the environment, or degrading ecosystems. Their technical components should be easily dismantled and reusable.
- In Poland, there are buildings in which recycled materials were used, but they remain the exceptions. Proper legislation and the expansion of support services is required.



THE CIRCULAR CITIES OF THE FUTURE ARE BEING CREATED RIGHT NOW

- Cities use as much as 70% of global energy and produce over 60% of global greenhouse gasses. They consume 80% of food and generate half of the world's waste. The concentration of many people, products, and buildings in one place is an almost perfect environment for introducing the principles of closed-loop economy.
- The key areas of transitioning cities towards CLE include introducing changes in the local food production chains, energy efficiency of buildings, transport solutions, energy supply systems, and proper waste management.
- The leader among the big cities striving for circularity is Amsterdam, but we find examples of solutions dealing with individual elements of CLE in many places around the world. Some good examples of this are sustainable public procurements in Berlin, or the waste management program in Slovenia's Maribor.





source: Possessed Photography, Unsplash

circular economy 101

1 what is a circular economy

Currently, we are producing and consuming goods in a linear fashion: we extract materials from the Earth, and create goods, which are then sold and used, until most of them are discarded. In effect, the amount of produced goods greatly exceeds our real needs, and the current model of managing goods and services

encourages short-term consumption¹. This way of using resources has been profitable for a long time, but it comes at an enormous environmental and social cost.

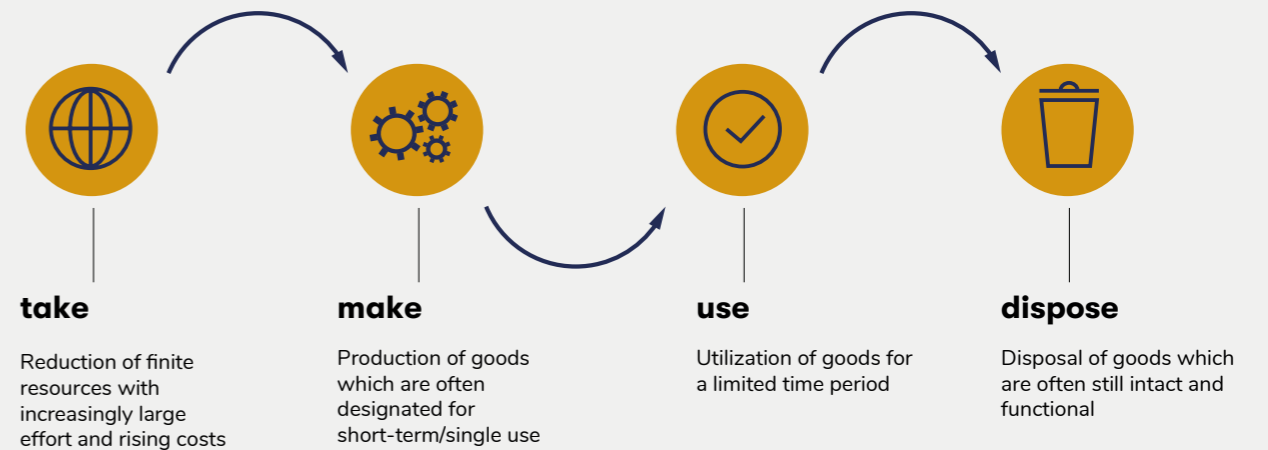
We are consuming 1.6 times more resources than the regenerative properties of Earth allow. Highly developed countries² are the main drivers of this phenomenon, with Qatar, Luxembourg, Bahrain, The United States, and the United Arab Emirates³ leading the charge (per capita). Poland uses a total amount of 613.4 million ton of materials every year, of which raw resources constitute 517.9 million ton. In 2022, the day we have used all the resources Earth was able to regenerate that year came as early as on July 28th⁴.

The main metric describing the level of a circular economy is the circularity gap. It stands for the percentage of resources that remain outside of the closed loop. Only 7.2% products and waste are processed cyclically worldwide, which leaves a huge gap amounting to 92.8%. That gap grows with each passing year, having increased by nearly 3 percentage points since 2018⁵. Poland doesn't fare much better, our circularity gap in 2022 was 89,8%⁶.



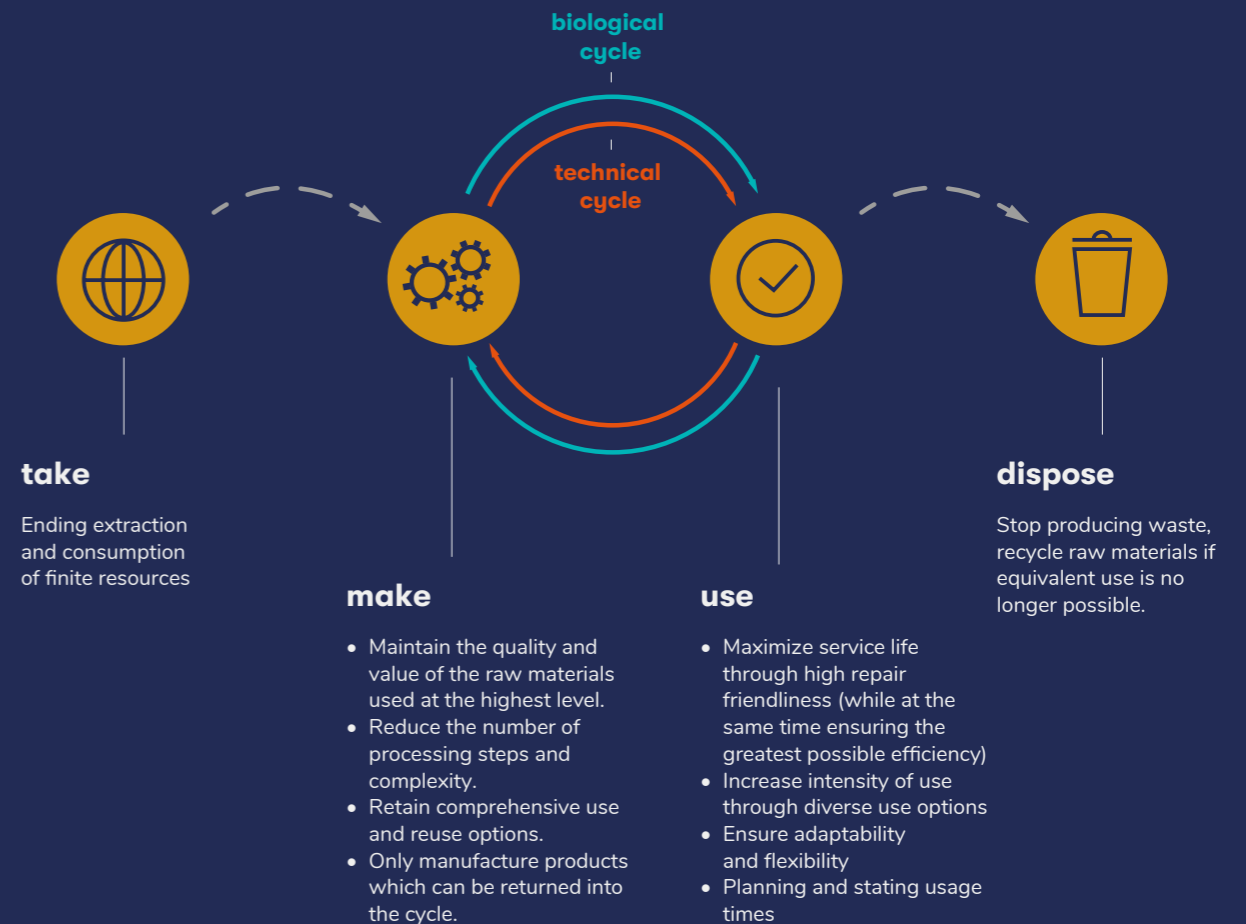
MODEL OF A LINEAR ECONOMY

source: DGNB, Circular Economy – Closing loops means being fit for the future, 2019



MODEL OF A CIRCULAR ECONOMY

source: DGNB, Circular Economy – Closing loops means being fit for the future, 2019





source: Mika Baumeister, Unsplash

It is estimated that introducing circular economy in Europe will grow the continent's GDP by 7% by 2030.

the main principles of a circular economy

The aim of a closed-loop economy, also known as a circular economy, is to preserve the value of products, components and materials for as long as possible, and to limit waste and pollution. The main motivation behind this is mollifying climate change and increasing biodiversity while meeting the needs of every citizen of our planet.

In practice, the main criteria of circularity are:

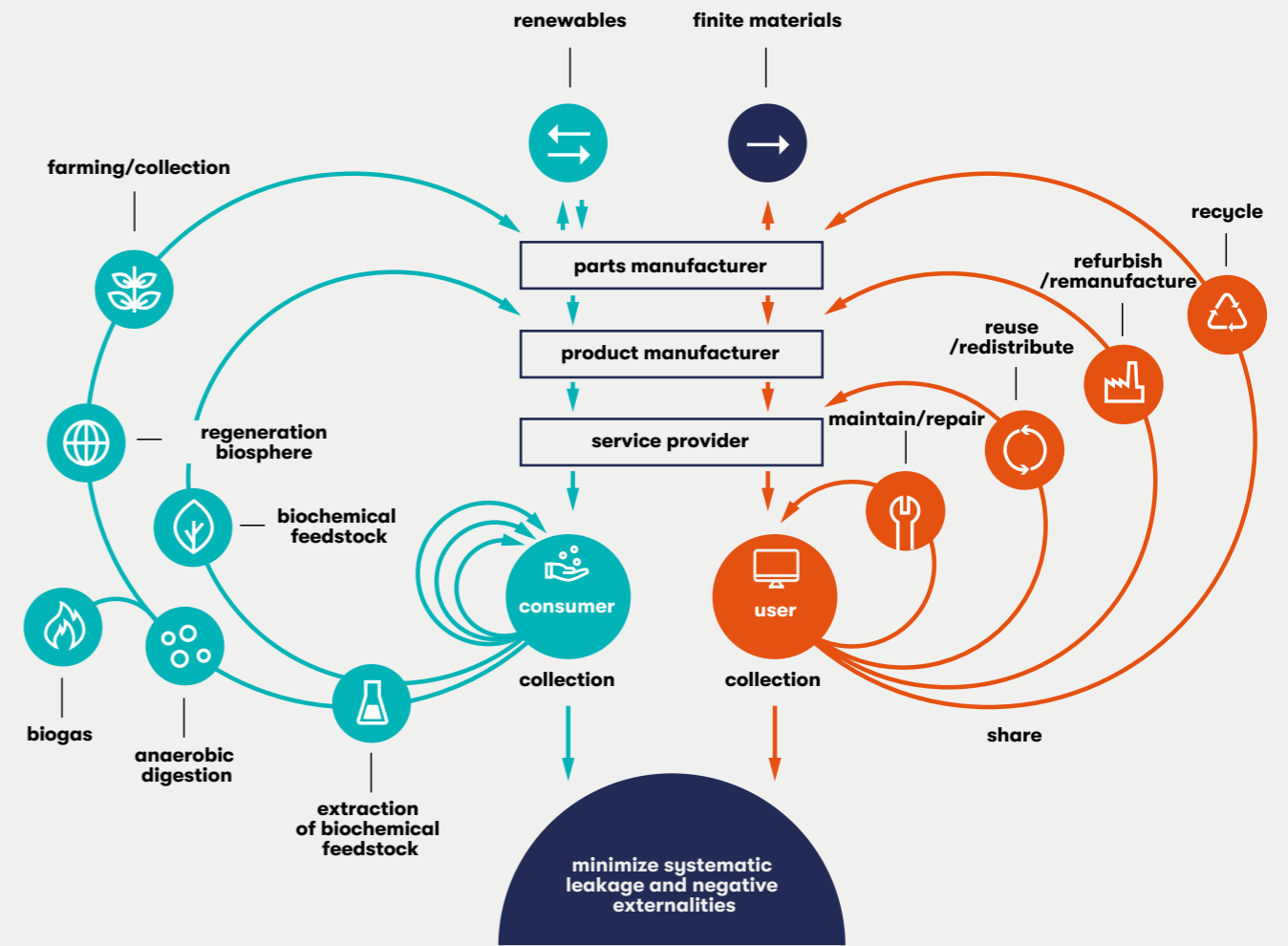
- using renewable energy and preserving natural resources

- optimizing the use of materials by keeping them in circulation without losing their original properties

- streamlining processes and removing inefficient elements⁷.

Moving from a linear economy model to a circular economy model requires a lot of engagement, financing, skills, knowledge, proper social attitudes, reorganizing business models, and adjusting regulations by introducing changes to legislation and creating attractive conditions for directed development. But sustainable development can be profitable. It is estimated that in Europe alone, introducing a circular economy by 2030 could increase the GDP by 7%⁸.

BUTTERFLY DIAGRAM OF A CIRCULAR ECONOMY



source: Ellen MacArthur Foundation, Growth within a circular economy vision for a competitive Europe, 2015.



Circular economy isn't just a single idea, but rather a complex system that uses the makes use of the constant circulation of materials through a technological and biological cycle, as shown on the so-called butterfly diagram.



The biological cycle refers to the renewal of nature, and products and materials that can decompose naturally (ex. food). It involves using side products of this type in other branches of the economy, producing high quality chemical products and regenerating ecosystems, ex. by composting.



The technological cycle involves keeping products and materials in constant circulation. It is a system of sharing goods and conserving them, the latter of which plays an important role in extending their functionality. Once they reach a high degree of wear, products are redistributed, reused, and then renewed. At the end of their life, when products can no longer be renewed, they are recycled.

LEADING TRENDS IN CE

Changing consumer behavior – a growing number of people choose sustainable consumption

Selective waste collection and recycling – the amount of waste collected selectively in Poland continues to grow

Eco-design – the number of products created with easy recycling in mind is increasing

Energy independence – producing energy for your own use thanks to growing access to photovoltaics, heat pumps, and recuperators

Green public procurements – taking into account principles of CE when it comes to the subject of the procurement and the way the winning offer is picked

CE TRENDS THAT AFFECT THE REAL ESTATE MARKET

Conversion and repurposing – changing the function of buildings, renovating and modernizing them. Compared to demolition and building something from scratch, these solutions reduce the amount of used materials and limit CO₂ emissions

Mixed-use – mixed-use investments allow for more efficient use of space throughout the day, and combining numerous services and purposes in one place reduces daily commute (which generates CO₂)

Revitalization of urban areas – increasing the attractiveness of existing neighborhoods through renovations and improving social relations limits the expansion of the city into undeveloped areas and provides motivation for adapting existing buildings

Circular materials – a new model of sourcing materials and using them consciously in order to ensure their longevity and allow them to be reused in the future

As much greenery as possible – turning public spaces, roofs, and façades green brings many benefits, in terms of CE - improved water retention and reducing temperature in the summer are key, as they allow administrators to use less air conditioning.

source: ThinkCo based on: PARP, Ocena zapotrzebowania na wsparcie przedsiębiorstw w zakresie gospodarki o obiegu zamkniętym (circular economy) [Assessment of support required by companies in terms of circular economy], 2020; PlanRadar, The architecture of the future, 2022.



THE 18 R'S OF CIRCULARITY

The reduction of generated waste has long been perceived in terms of the so-called 3 R's – Reduce, Reuse, Recycle. However, circular economy requires a more complex approach, which can be shown by expanding the list of R's.

Reduce	Reuse	Recycle	Repair ...products and create ones that are easy to repair
Refuse ...to use solutions that do not support circular economy	Refurbish ...and improve existing items	Remanufacture ...bring products back to their original state	Reconceptualise ...prosperity to bring an end to overconsumption
Redesign ...products so that they are fit to be recycled and can be manufactured using fewer materials	Repurpose ...products to give them new functions	Recover ...energy used and waste produced during production	Replace ...existing materials with sustainable ones
Redistribute ...energy, technology, and resources within countries and between countries	Re-evaluate ...values to limit materialism and egoism	Re-localise ...industrial and farm production processes	Restore ...the ecosystem to its original or an improved state
Rethink ...products to maximize their usefulness	Restructure ...production systems to fit a circular economy		

source: ThinkCo na podstawie: Capgemini, Circular Economy for sustainable future, 2021; Revolve Circular, Utrecht University, How do you imagine a Circular Economy? Survey report, 2022.

recycling is not enough

Recycling has its benefits, but within the context of circular economy, it is considered to be a last resort. One of the main tenets of circularity is preserving the quality of already extracted and processed materials. With the exception of materials such as glass or aluminum, most of recycling results in so-called downcycling, yielding in materials of inferior quality. Then one of two things can happen: either the inferior product ends up in a consumer's hands, but there is still demand for newly manufactured products, or new components are introduced into the processed material.

For example, when plastics are melted and combined, their properties – such as elasticity – change. In order to achieve the desired result, new chemicals or minerals need to be added into the mix. Thus, recycled plastics can end up containing more additives than the source material.

Even though recycling can be useful, the key to circularity is designing products and materials geared towards reuse, repairs, and repurposing.

source: Rumman Amin, Unsplash

the first building in Czech Republic constructed in keeping with the principles of Circular Economy



Eva Nykodymová,
Environmental and Health & Safety Manager

The Prague district of Holešovice is home to three modern office space projects by Skanska: Visionary, Port 7, and Mercury. – Out of these, Mercury is of particular note, as it is the first investment in the nation that is being implemented in keeping with the principles of CE - says Eva Nykodymová, Environmental and Health & Safety Manager at office company Skanska for Central and Eastern Europe.

Mercury will replace the 1971 Merkuria building, which no was longer meeting current standards for safety, health, and environmental impact. The decision to demolish it was preceded by in-depth analyses of its design, the materials

used, and systems installed, which made it possible to reuse many of its components. The next steps were donating the building's equipment to those in need, removing and sorting the installations, and carefully dismantling the structure.

In total, approximately 14 000 tons of reusable or recyclable materials should be recovered. After sorting and grouping the materials, Skanska began looking for potential buyers. Some of the items ended up on Cyrkl, a platform for industrial waste management and green sourcing.

One of the biggest challenges turned out to be the fact that the composition of the recovered materials was not always clear,

as documentation was either lost over the years, or never existed in the first place, which necessitated additional, specialized testing. The mixed composition of some elements proved to be another obstacle. For example, façade elements contained glass, but also steel, insulation materials, and other components.

- The buyers' expectations complicate the process even further. They might, for example, be interested in plastic pipes, but only ones that are properly cut. Meeting these expectations is possible, but requires additional effort, time, and increases costs. Furthermore, sometimes the buyer cannot arrange transportation, and expects the developer to facilitate and pay for that as well, adds Eva Nykodymová.

Skanska's ambition is to use as much reclaimed material as possible. One example is crushing concrete recovered during demolition and using it to create the superstructure of new buildings. Skanska has patented this material under the name Rebetong. Kitchen fixtures have already been given a new life in refugee homes, and several dozens of doors were donated to the University Hospital in Prague. The company has also found partners who turned fixtures and fittings into art and other products, such as flower pots made of pipes.

The actions taken by Skanska prove that it is possible to apply the principles of CE in the office real estate sector. However, entities that decide to embark on such a venture should be aware that it is a time-consuming process.

- I don't think that at this stage of our industry's development, circular demolition can be carried out quickly. It's a new way of doing things, and we all need to learn the ropes. But it is essential if we really want to preserve our resources and the environment. We at Skanska are happy to spearhead this unique endeavor, concludes Eva Nykodymová.



source: Skanska

source: Skanska



legislation

source: Guillaume Perigois, Unsplash

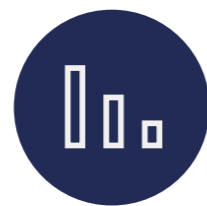
2 the legal situation of Circular Economy

EU level

THE EUROPEAN UNION'S MAIN CLIMATE GOALS



by 2050
climate neutrality



by 2030
reducing net greenhouse
gas emissions by at least
55%, as compared to 1990



source: Markus Spiske, Unsplash

European Green Deal

A set of initiatives aimed at putting the EU on a path towards ecological transformation.

THE 8 FOUNDATIONS OF THE EUROPEAN GREEN DEAL



source: Lech Mazurczyk, Future Industry Platform, 2022, (accessed on: 10th April 2023)

initiatives of particular importance to the real estate market



EU TAXONOMY

- a system of classification that sets definitions and criteria for evaluating particular activities of companies in terms of sustainable growth
- requiring companies to provide financial, non-financial (activity-based), and taxonomical reports
- newly constructed buildings need to be compliant with taxonomy:
 - primary energy requirements at least 10% below the national Nearly Zero Energy Buildings threshold
 - air leakage and thermal integrity tests for buildings with over 5 thousand m2 of usable space
 - determining the global warming impact over the building's life cycle for buildings with over 5 thousand m2 of usable space
- compliance with taxonomy in existing buildings:
 - renovations in keeping with the principles of thorough renovations
 - alternatively, renovation leads to a reduction in primary energy use by at least 30%⁹
 - areas included in the Taxonomy: foresting, agriculture, construction and the real estate market, heavy industry, energy and fuel industry, water and waste industry, transport and warehousing, IT and communications

- the term 'area' applies to all companies that use its elements in their operations; in case of real estate, this translates into mandatory declarations in nearly all of the areas listed above, given the nature of ex. transporting materials, construction, or the supply of utilities and managing their consumption.
- compliance with taxonomy in newly constructed buildings:
 - demand for primary energy at least 10% lower than the national NZEB (near zero energy building) threshold
 - tests of airtightness and thermal integrity of buildings with usable space of over 5 thousand m2
 - global warming ratio over a building's life cycle for buildings with usable space of over 5 thousand m2

Impact on the real estate market:

a new tool for assessing investment and reputation risk, minimizing greenwashing, easier financing for "green" products and services.



THE RENOVATION WAVE

- a set of programs aimed at removing barriers that impede renovation and achieving ambitious goals in terms of the energy efficiency of existing buildings
- financial incentives for thorough renovations
- diversification of specialists in the construction industry through the New European Bauhaus
- mandatory certifications of energy performance for all buildings offered for sale or rent
- mechanization and standardization of EU data collection in terms of certification
- introducing a definition of thorough renovation, i.e. a renovation which results in a building becoming near zero energy

Impact on the real estate market:

the value of buildings becoming dependent on their energy performance, investments into improving the energy efficiency of buildings



A NEW PLAN OF ACTION FOR INTRODUCING A CIRCULAR ECONOMY

- coordination of the European Union's circular initiatives
- lists 35 key actions and charts a path towards reducing consumption
- introduces initiatives that cover the entire life cycle of products, ex. their design process
- names construction and buildings as one of the seven key areas of implementing a circular economy
- includes a strategy for transforming the built environment

Impact on the real estate market: removing roadblocks and introducing circularity requirements for each investment stage, detailed in a as yet unpublished strategy (spring 2023)



FOR MORE INFORMATION,
SEE THE THINKCO REPORT

Responsible Investments.
ESG on the Real Estate Market



source: System 3E



THE REPOWEREU PROGRAM

- additional investments amounting to EUR 210 billion between 2022 and 2027, aimed at making Europe energy independent
- independence from Russian fossil fuels long before 2030, a move that is supported by 85% of Europeans
- energy diversification – renewable energy sources, including renewable hydrogen in the future
- saving energy as part of the so-called “baby steps” system – turning off lights, switching to bikes/public transport, lowering temperature in rooms
- incentives in the form of reduced VAT for highly efficient heating systems and insulation of buildings¹⁰
- buildings

Impact on the real estate market: popularization of renewable energy installations and intelligent energy saving systems in buildings



ENERGY PERFORMANCE OF BUILDINGS DIRECTIVE

- all newly constructed buildings should be emission-free, and by 2050 all existing buildings should meet the same standard
- supporting automatization and intelligent solutions in buildings
- benefits from maximizing renewable energy sources included by member states in evaluations of building energy performance
- direct access to data on construction systems
- renovation passports and indexes of intelligent network readiness for buildings¹¹

Impact on the real estate market: transparency in property documentation, increased social awareness, reduction of greenhouse gas emissions from buildings

national level



THE NATIONAL PLAN FOR ENERGY AND CLIMATE 2021-2030

- creating a definition of energy poverty and a methodology tailored to Polish circumstances
- improving energy efficiency by 2030 by developing eco-friendly and efficient heating systems, producing heat via cogeneration, intelligent networks, and promoting pro-savings attitudes
- ensuring energy security, particularly by meeting the need for fuels and energy resulting from economic growth
- improving the accessibility of cross-border electricity connections by investing in internal gas and electric networks and creating an internal energy market¹²



LONG-TERM STRATEGY FOR BUILDING RENOVATION

- eliminating the use of coal in all residential buildings by 2040, and in big cities – by 2030, with the option of using smokeless fuel until 2040
- gradual reduction of reliance on other fossil fuels in buildings, including natural gas, by 2050
- replacing heat generators or using zero-emission alternatives, ex. biomethane, synthetic fuels, hydrogen
- launching programs for supporting investments in building renovation, particularly in terms of far-reaching thermo-modernization¹³



In investments, we are focused on areas that have been touched by history, and ones that we can renovate. It is tempting for us to transform brown-field sites. We revive them, respecting their history and their original functions. We know that historic buildings require special attention and procedures, and we are not afraid of such projects. We are aware that today's clients focus on not just the design of a property, but also on its values - which can't be merely empty platitudes contained to marketing slogans. What counts is a firmly established philosophy that defines the quality of an investment.

Revive's mission is to design and implement innovative and multifunctional investments for the residents of large cities. Poland is still full of degraded urban areas. We believe that therein lies great potential, and that once restored to life, these places can become true gems and showpieces of their cities. In the implementation of our investments, we focus on sustainable development and modern solutions that promote ecology, striving to reduce our carbon footprint as much as possible.



Agnieszka Jaworska
Head of Marketing and Sales
at Revive Poland

A behind the scenes look at Circular Economy on the Polish real estate market: challenges, obstacles, and opportunities



Elżbieta Rotblum, expert on sustainable development for Skanska in Central and Eastern Europe:

Elżbieta Rotblum: It's difficult to unambiguously evaluate the extent of the implementation of circular economy on the office real estate market in Poland. On one hand there's recycling, which has been promoted for years, and it is now easy to purchase materials with a recycled component. For example, buildings constructed by Skanska contain recycled steel and aluminum, we also use concrete rubble, ex. for ballast. Some materials, for example glass in windows, or glass wool in isolation, also contains recycled components. Producers are buying good quality glass and turning it into new windows or isolation. Recycling can also rely on infrastructure that allows you to reintroduce the material into circulation after it has been processed.

Reusing is a different story. Above all, the practice of reusing materials, freshened up or cleaned before reuse, hasn't been popularized in our country yet. The last 30 years were a period of rapid growth in terms of the economy and prosperity, and resulted in a conviction that new equals good. The recent geopolitical crises, broken supply chains, depleted natural resources, and above all the climate crisis, have laid bare the need to change our thinking and put a bigger emphasis on "reuse". In the real estate market, another factor that works in CE's favor is the shrinking amount of land for development in cities. That is

why we are turning to existing buildings that are not energy efficient and can't be modernized.

In terms of reusing materials (except for furniture, because in this regard we're already seeing some sort of breakthrough), we need proper legislation and more support services. Currently, if we want to transform stone wall lining, for example giving it a matt finish to reuse it as a floor, we run into a series of obstacles. Under the current legal definition of "preparing for reuse", even cleaning turns the material into waste. For the above-mentioned wall lining to be processed outside of the original property, ex. at the manufacturer's facilities, it needs to leave the premises, which means that is entered into the Waste Database (BDO) and classified as waste. Therefore, its recipient must be qualified to receive waste, because undertaking any actions to prepare the material for reuse requires a permit to process waste.

So we're already required to overcome a whole series of legal hurdles, and that's before we even reintroduce this reclaimed stone slab into circulation. The next step is obtaining permits, or actually charting new procedural paths, to make it fit for use: technical tests at the Building Research Institute, followed by hygienic and fire tests. All of this generates costs, and on top of that, it is hard to determine how long the whole process is going to take.

But there is a light at the end of this long tunnel. Manufacturers of modern materials, ex. paneling and dropped ceilings, are starting to introduce take-back systems, offering to retrieve their materials once their "life" in a given location is over. We're also waiting for such services to start being offered for materials manufactured many years ago.

The popularization of circularity in the real estate market is not easy, but it seems like it would pay to try to overcome the current obstacles. I see great opportunities in the creation of an entirely new branch of economy, which will spawn thousands of jobs. Selective demolitions, proper storage of materials, digital platforms that facilitate the trading and exchange of construction materials, certification of materials, evaluation of materials and entire properties built using said materials, insuring these investments, restoring and reclaiming materials...

The list is endless, unlike our precious resources and raw materials. We are also setting ambitious climate goals, both as Skanska and as the European Union. Introducing circularity is one of the best ways to help us, as a species, start seeing Earth as a place fit for continued habitation, and stop thinking in those terms about... Mars. The only dangers I can see is the potential speed of implementing these changes, given humanity's change-averse nature.



source: Skanska



source: Skanska

understanding ESG as a competitive advantage

The real estate market is due for a real green revolution resulting from EU regulations concerning green activity (EU taxonomy) and the new EU standard on non-financial reporting (CSRD/ESRS). Stakeholders are expecting more and more information on ESG, demanding sustainability in terms of the environment, society, and corporate governance.

However, there is not enough specialist knowledge on the market to help developers, investors, general contractors, and building managers face the challenges these changes bring. That is why ThinkCo has prepared a comprehensive ESG workshop for the real estate sector.

The aim of this workshop is to provide information about ESG tailored to the needs of the real estate market. Over the course

of the workshop, we go step by step through the essentials of ESG and show how they are going to impact the organization in question in the future.

- The influence of EU taxonomy on the real estate market will be significant, because it is going to tie the so-called taxonomy alignment of organizations to their environmental responsibility. Moving the debate on sustainable development to the bank level means that eco-friendliness will become the new norm. In order to maintain their market value and their shareholders, companies will be forced to start planning their actions with green solutions in mind – explains Przemysław Chimczak-Bratkowski, Managing Partner at ThinkCo.

The companies that have taken advantage of this workshop have also received

a comprehensive overview of key legislative requirements which will soon affect the business environment on the real estate market. They were provided with a list of specific actions that should be undertaken by organizations which are only just starting their journey towards full sustainability.

Over the course of the workshop, we provide a detailed overview of various aspects of E, S, and G; we sum up the EU taxonomy and explain how it affects the real estate market; we offer concrete knowledge on how developers, managers, and investment funds operating in the real estate market can implement ESG standards in their organizations, step by step.

The workshop includes topics such as: ESG-related regulations, with special emphasis on EU law, measuring the impact of buildings and organizations on the environment, an EU taxonomy guide, standards of non-financial reporting, a detailed overview of each of the letters: E (environmental aspects), S (social aspects), and G (corporate governance).



source: Oleksii Drozdov, Unsplash



source: Fons Heijnsbroek, Unsplash



source: Redd, Unsplash



the second life of buildings

source: Jeriden Villegas, Unsplash

3 adaptations

Adaptive, expansive and proactive – the three main strategies for reusing buildings

The term adaptation is used to describe various work done to a building that goes beyond its basic maintenance and changes its function or efficiency, i.e. every intervention that aims to repurpose a building or adjust it to new conditions and requirements.

Adaptations have been performed since the dawn of architecture. Many buildings, which are today considered historic, have changed their function repeatedly over time. These days, with the gradual exhaustion of land reserves in cities, and the development of our civilization, adaptations have only gained in importance. Changes are

necessitated mainly by our constantly evolving functional needs. Old buildings no longer meet the current, increasingly stringent requirements, though it is also important to maintain their aesthetic and cultural qualities¹⁴.

Adaptations of buildings are highly individualized and complex investment efforts. The design process is in a sense reversed, as compared to a typical construction, where the new property is tailored to perform specific functions from the start. With adaptations, the planned function should be adjusted to existing architectural conditions.



źródło: Cavallia Sp. Z o.o

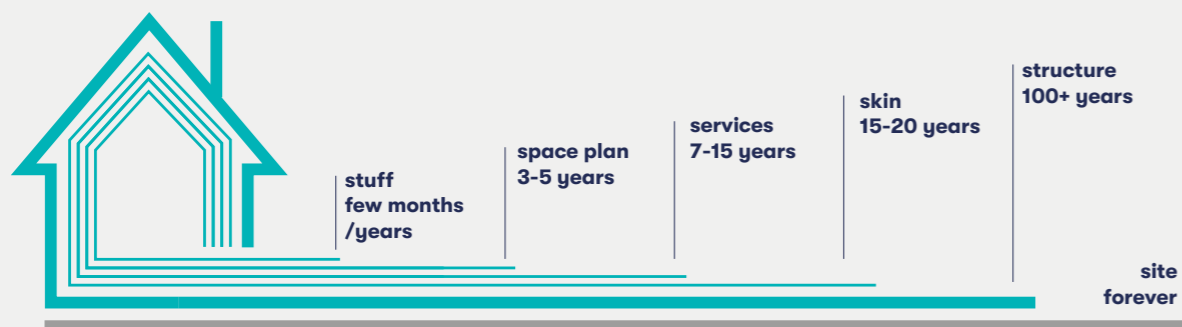
types of more efficient reuse of buildings

There are three basic strategies of repeated or more efficient reuse of buildings: adaptive, expansive, and proactive. All of them are related to renovation and modernization efforts that extend the life cycle of objects and increase their efficiency. In case of large complexes, all of these strategies may be implemented simultaneously, depending on the requirements of individual buildings. This applies, above all, to sprawling post-industrial areas which are increasingly often being converted into mixed-use properties.

Modernizing older generation commercial buildings is a market necessity. One of the main reasons for this is the scarcity of attractive land for the construction of new, tenant-friendly developments. In addition, the experience of the pandemic has shown us that not all types of buildings will maintain their function. For example, some office buildings and hotels have been converted into residential buildings. The low energy efficiency of older buildings, and the increase in energy costs, are also important factors. Without the introduction of modernizing measures, operating costs will continue to rise, reducing income from rented spaces.

This transformation is largely being forced by the high competitiveness of newly constructed buildings, and market demands. Class A office buildings are offering high-end space, so other office buildings are being improved to maintain their existing customers, and attract new ones. Decisions on renovations and improvements are also influenced by regulations, which are gradually affecting more and more companies and introducing new challenges. Investments into modernization are therefore becoming necessary to meet the demands of our changing landscape.

THE DURABILITY OF BUILDING LAYERS



source: L. A. van Ellen i in., Rhythmic Buildings-a framework for sustainable adaptable architecture, Building and Environment, 2021.



FOR MORE INFORMATION, SEE THE THINKCO REPORT Mixed-use in Poland and abroad



Jerzy Wójcik

Founder and CEO of JW+A consulting



ADAPTIVE REUSE

Adaptive reuse changes the object's function, which entails introducing changes to its structure and furnishings. It is employed when, for example, ageing office buildings are converted into residential properties, or post-industrial buildings are converted into shopping centers.

One well-known example of this kind of transformation is the Stary Browar complex in Poznań, which was constructed in the 19th century. In 1980, beer manufacturing was moved offsite, and the property fell into disrepair. At the beginning of the 21st century, the buildings were adapted to perform various new commercial, cultural, and office functions. A popular way of revitalizing historic properties is to give them a cultural function, although naturally adaptations are not limited to post-industrial monuments, and these new functions are frequently also commercial in nature. One such example is the modernist terminal of the New York airport, which was unable to continue performing its function due to growing traffic, but was reborn as a hotel¹⁵.



EXPANSIVE REUSE

Expansive reuse means an expansion of the way a building is used through modernization and adding new space to existing buildings in a creative way to maximize their value. Adding new floors to existing buildings or creating basements can significantly increase the number of ways in which they can be used¹⁶.

A well-known example of such creative expansion is the Grand Parc estate in Bordeaux, which has received the Mies van der Rohe award, among others. The French architects Lacaton & Vassal have altered a large apartment bloc in the French city of Bordeaux by adding an external layer of winter gardens and balconies. The original façades were removed, and the apartments received more light, air, and a better view, thanks to the addition of 3.8 m deep prefabricated modules. Meanwhile in Poland, though admittedly less spectacular, additions of new balconies and elevator shafts is also gaining in popularity, as they significantly increase accessibility and user comfort. But expansions don't necessarily need to be noticeable from the outside. The 19th century Groote Museum in Amsterdam received an expansive basement, which allowed for the creation of an entirely new entry area, and provided the museum with much needed space for storage, cloakrooms, and bathrooms¹⁷.

fot. Wikipedia, Filip Dujardin



PROACTIVE REUSE

Proactive reuse refers to situations where a building is still in use, and we are taking preventive action in order to avoid its deterioration or loss of function. It consists of modernizing the building, implementing new technologies, and targeted repairs of problematic areas.

One spectacular example of proactive reuse is the Empire State Building in New York, which has served its function as an office building for nearly a century. It was constructed in 1931, and underwent numerous modernizations. A program was launched in 2009 to replace elevators, air conditioning systems, and 6514 windows. As a result of these and other improvements, the building was certified LEED Gold in 2011¹⁸. Modernization can also be a way to address original design flaws. One example is the Grand Hotel, built in the 1870s in Birmingham, whose façade was rapidly deteriorating. The culprits turned out to be a bad water drainage system and the poor quality of stone slabs. Following the introduction of improvements, the historic façade is now more resistant to weather conditions and doesn't have to be cleaned as often¹⁹.

THE BENEFITS OF ADAPTATION

<p>Environmental</p>	<ul style="list-style-type: none"> • Reusing buildings brings us closer to achieving zero CO₂ emissions. It takes a new, energy-efficient building between 10 and 80 years to neutralize the fallout from its construction and start generating savings in terms of net energy use • Changing the purpose of an existing structure reduces the need for using additional new materials • Reducing the number of construction waste • Avoiding demolitions, which generate dust and negatively affect air quality • Using much fewer natural resources • Saving energy by upcycling existing structures and their materials • Reducing greenhouse gas emissions
<p>Cultural</p>	<ul style="list-style-type: none"> • Protecting cultural heritage • Maintaining the area's identity by preserving characteristic buildings and the stories related to them • Preserving original style and architecture, which may attract tourists
<p>Urban planning-related</p>	<ul style="list-style-type: none"> • Reducing the use of land and the degradation of cities • Limiting uncontrolled urban sprawl
<p>Economic</p>	<ul style="list-style-type: none"> • Increasing the value of the building and surrounding properties • Frequently lower construction costs achieved by using the existing structure and avoiding the costs of demolition, transport, and processing of waste

based on: Redshift by Autodesk, How Adaptive Reuse Gives Defunct Buildings New Leases on Life, <https://tiny.pl/w8qzw> (dostęp: 22.02.2023); Parametric Architecture, Building a sustainable environment. A guide to adaptive reuse architecture, <https://tiny.pl/w8q3m> (accessed on: 22nd February, 2023).

Revive is all about revival



Alexandre Huyghe
CEO Revive Poland:

The Cavallia Estate, which is the latest investment by Revive Poland, implemented in cooperation with BPI Real Estate Poland, is located in the former cavalry barracks in Poznań. What are the challenges one faces when developing historic areas?

Alexandre Huyghe: Formally, such investments require close cooperation with the office of the city or provincial conservationist. The project must blend in with its surroundings and harmoniously merge with them. Contrary to the opinion of some architects, we believe that new residential estates should not pretend to be historic landmarks, but rather show the authentic development of the city, in the context of both the space, and the time in which they are being built. The Cavallia project shows that contemporary architecture can be cohesive with historic surroundings, and even emphasize their character.

How?

The cavalry barracks built on the west side of the Warta river determined the development of the Łazarz district in that era. At the time, more than 100 years ago, Art Nouveau townhouses were built, housing high-ranking officials and military officers, university teachers, lawyers, and doctors. These buildings have survived to this day, and many are currently undergoing extensive revitali-

zation. Our mission as a developer is to continue the development of this neighborhood. The site of the former barracks, purchased jointly with BPI Real Estate Poland, is a plot of 5.5 hectares, and for the past several decades was used only as a storage and parking space. We are now transforming it into a multifunctional green estate with historic buildings that immensely increase its value. Those historic buildings will be revitalized, their function changed to meet modern requirements and the needs of the local community, resulting in offices, as well as a leisure and service space. We have already revitalized the area by creating the Culture Barracks, a temporary initiative allowing residents of Poznań can take part in a variety of cultural events. Such creative recycling of investment areas has become the hallmark of Revive. What's more, the project has received an award in the prestigious Real Estate Impactor competition in the category "Property With Added Value."

Cavallia isn't the only Revive Poland investment that is being implemented in an area of historic significance. How different are these projects from one another?

Each site has its own story, with which we familiarize ourselves thoroughly before construction begins. When we create projects, we give them a personality, which is expressed in the name,

the slogan, and our overall communication strategy. The history of the site plays a key role in this process. There is a reason why our Polish projects are called Imperial Shipyard and Cavallia. The names of our Belgian developments also allude to the past of their locations, for example Den Draad (bel. "The Wire"), which is being developed on the site of a former wire factory, or Minerve, being developed in the former Minerva bicycle factory.

The development of neighborhoods is also linked to heritage, which in our opinion should be preserved. That's why, while creating the Cavallia estate (the project's name comes from the Italian word cavallo, which means "horse"), we have created *historiawartapoznania.pl* which showcases the history of the area we are currently developing. It is mindboggling that so many locals did not know the past of this area, or that the famous 15th Poznań Lancers Regiment was stationed here. We are very proud to have brought this history to life. It proves that our mission as a developer often goes beyond just "designing and building."

You're not worried about criticism that you're interfering too much with historic areas, thus lowering their cultural value?

We're doing exactly the opposite - we restore their value. We are revitalizing forgotten and often decaying places, giv-

ing them back to the city and its people. The best example of this is the Imperial Shipyard in Gdansk, which was closed for years. We have renovated historic properties, created a historic walking tour, and reminded the local community of the area's remarkable past. Of course, some of the buildings serve different functions today than they did years ago - they have been adapted into office spaces, restaurants, and a wine bar. We believe that in order for a city to develop naturally, we have to create spaces that are useful to its residents while taking care to preserve historic architecture.

How will non-residents of the estate be able to make use of these spaces?

There will be many options. Let's start with the fact that our estates are open - after all, our primary goal is to restore the area to the city, and to integrate the local community. Moreover, our investments are not limited to putting up residential buildings. Multifunctionality is of great importance to us, which is why we also create spaces for commerce, offices, leisure zones, restaurants, and cultural and entertainment institutions. This is what "comfort of living" means to us. We design neighborhoods that are integral parts of the city, rather than enclaves located within its boundaries. Revive's credo is integration, synergy, and openness.

source: Cavallia Sp. Z o.o.



maintaining the balance between history and modernity. The challenges of implementing the Cavallia investment

The child of Revive Poland and BPI Real Estate Poland, Cavallia, is being born in the former Poznań cavalry barracks. This multi-function project estate will consist of residential buildings, offices, and a service-recreational area. It aims to bring life to the Łazarz district and make full use of the potential of a 5.5 ha plot in the middle of the city, while integrating the local community.

The implementation of the project is challenging, as it is a location rooted deeply in the local historical and cultural context. Furthermore, Cavallia is a large scale project set to be implemented over a long period of time. A joint venture of two

Belgian developers was created for the development, which brings the additional challenge of operating within two organizational environments.

History

One of the key elements that define Cavallia's unique character is the skillful weaving of modern architecture into the historic fabric of the former barracks. Three historic buildings that formerly served the famous 15th Poznań Lancers Regiment (the quartermaster's headquarters, an outbuilding with a kitchen, and the squadron building) will be revitalized and serve as office buildings. The stables and indoor riding arena

will become cafes, restaurants, boutiques, and other public facilities.

In order to popularize the history of the site on which Cavallia is being built, the project historiawartapoznania.pl was created. It is an online platform showcasing the area's heritage, which serves as proof that developers don't always focus solely on the future.

Complexity, versatility, scale

The estate is being built on an area the size of 5.5 hectares, which has existing vegetation, including several-decade-old chestnut trees. It was necessary to plan the investment in such a way as to save as much nature as possible, especially since the project is being carried out in the center of Poznań. Greenery will therefore occupy as much as 35% of the area.

It was also a challenge to stage the project in a way that would allow it to be completed in the shortest time possible, with minimal impact on the lives of the area's residents. That is why the first segment to be constructed are the office buildings on the busiest Grunwaldzka Street, which will provide acoustic insulation for the remaining work.

The historic stables and riding arena have been planned as a service and leisure zone, accessible to all due to their location in the vicinity of existing and planned residential buildings.

Joint venture

Creating a team using the employees of two de facto competing real estate developers - with different work cultures, approaches to sales, marketing, and management - required a strategy that would secure the interests of both parties as well as allow for smooth cooperation and achieving their common goal in a positive atmosphere. The solution was to precisely delineate areas of responsibility and action for both partners. Thus, for example, in the first stage of the project, Revive Poland took point in marketing, and BPI Real Estate Poland focused on sales.



źródło: Cavallia Sp. Z o.o

źródło: Cavallia Sp. Z o.o

palatial beauty in a new guise

It was a dilapidated, sad, and seemingly undistinguished historic building in the downtown area. Thanks to an investment by Torus, Wrocław's Leipziger Palace underwent a thorough revitalization. The work took several years and was completed in 2022, restoring the palace to its former glory and allowing visitors to once again admire its intricate architectural ornamentation and historic stucco details. The building now houses the five-star Altus Palace Hotel.

The palace was built between 1872 and 1874, and designed by well-known Wrocław architect Karl Schmidt. It featured many functional solutions and was notable for its rich ornamentation and numerous architectural details. Until 1945,

it served an administrative function, and after the war it became an office building. Over the next decades it deteriorated, gradually losing its most valuable features. In 2016, it was bought by the Torus company from Gdansk, which decided to restore it and adapt it into a hotel.

- When I first saw the Leipziger Palace, I imagined what it could look like, and the reality exceeded my expectations (even though the investment itself was extremely demanding). I think it is now one of the more interesting offerings among Poland's boutique hotels - says Slawomir Gajewski, CEO of Torus.

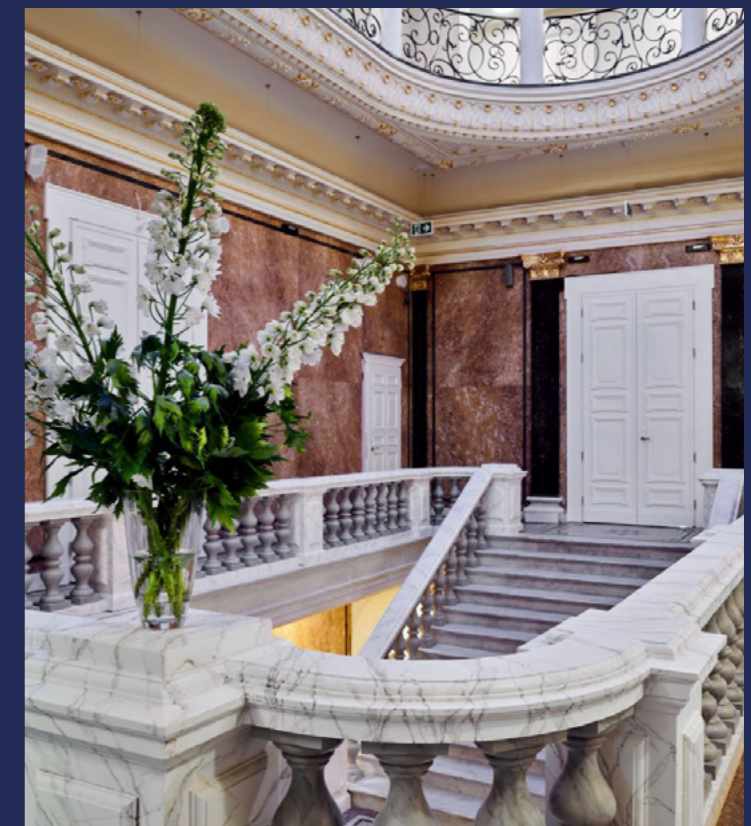
The renovation was preceded by archaeological work, which revealed many

interesting facts. In the basement, a canal dating back to the 18th century that used to drain water into a moat was discovered, among other things. The building also formerly housed a vault with a unique door and several safes. Some of the windows had external steel shutters, which have been restored, most of their mechanisms still intact. On the inside, interesting finishes imitating other materials were discovered. Painted wooden balustrades looked like they were made of marble, while stucco ceilings imitated wood. Now the illusion has been restored. In the ballroom, fragments of the original wooden mirror substructure were found, along with some pieces of the original glass. This was also restored.

Valuable stucco, marbled stucco, and an ornate staircase were preserved, as was some of the historic woodwork, parquet floors inlaid with exotic wood, and paneling. A large number of stone façade details have been uncovered of particular note here is the ballroom's stone bay window. The original baroque ceiling, built over in the 1920s, has regained its splendor; areas identified as originally having been gilded have been restored using large quantities of 24K gold flakes.

The building was also enriched with tastefully selected modern arrangements. As a result of the investment, the building is once again a palace, the fitting seat of a five-star hotel. The Altus Palace boasts 81 comfortable rooms and suites, as well as a restaurant, a bar, a conference room, and a wellness area and gym. The property is managed by the Dobry Hotel Group.

Architectural design of the building's renovation: Archikon Anna Kościuk; interior design: LOFT Magdalena Adamus; supervision of conservation and restoration work: Ewa Kuśnierz-Zawadowska; management of restoration teams: Lucyna Wojdyła and Jolanta Otwinowska.



source: Torus

source: Torus

designed for the future

Increasingly often, we come to the conclusion that the durability of buildings often exceeds their functionality, so we should start designing them with potential future transformations in mind. This applies to reconstruction, expansion, and partial or complete demolition of an object.

adaptive architecture

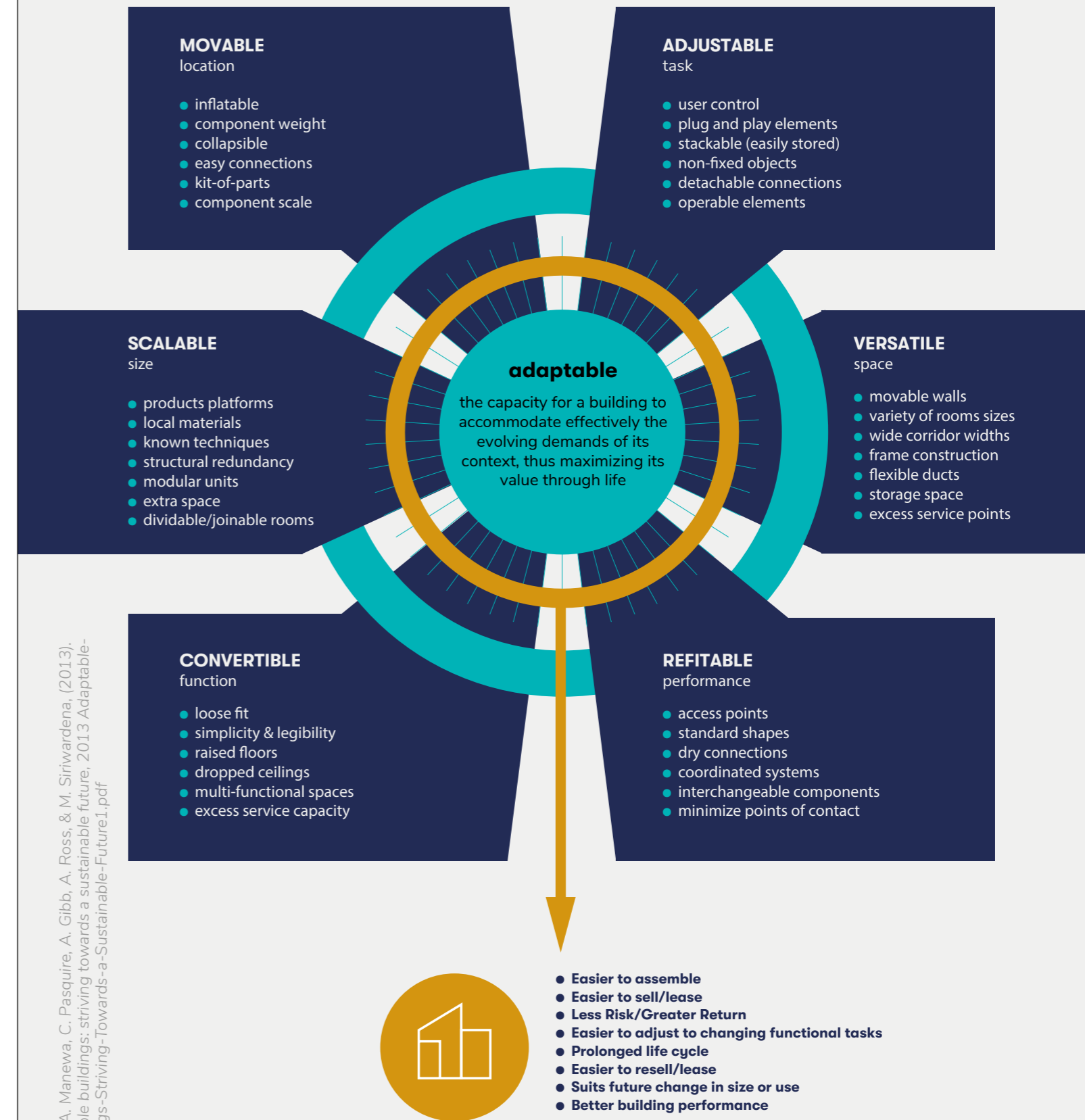
The primary function of adaptive buildings is reacting to changing external conditions and our expectations²⁰. This innovative approach to design prioritizes flexibility, which allows for transforming the building in the future. By doing this, we are helping its future owners conduct faster and more efficient reconstructions and expansions, which reduces the building's carbon footprint and cuts down on costs. Thus, we are also helping ourselves – the need to introduce alterations might come much sooner than anticipated, particularly as a result of sudden social, economic, or legal changes.

Building transformations are made easier by creating versatile spaces, which can be achieved through efforts such as creating open floor plans, or reducing floor level differences. A building designed in the spirit of adaptive architecture should easily yield to functional and structural changes. This also includes thinking about potential expansions, or – on the contrary – reductions of the property in the future²¹.



source: Skanska

FRAMEWORK FOR ADAPTIVE ARCHITECTURE



source: A. Manewa, C. Pasquire, A. Gibb, A. Ross, & M. Sirirwardena, (2013). Adaptable buildings: striving towards a sustainable future, 2013 Adaptable-Buildings-Striving-Towards-a-Sustainable-Future1.pdf



recommendations for adaptive architecture

1.

PILLAR-LESS SPACES

Creating open spaces that can be repeatedly modified in the future without introducing expensive structural changes.

2.

TALL ROOMS

They can be adjusted to nearly any potential function. They improve your capacity to use natural light and ventilation.

3.

AS FEW LEVEL DIFFERENCES AS POSSIBLE

Fully flat floors offer more flexibility in terms of the room's function.

4.

INTERNAL NON-LOADBEARING PARTITIONS

The ability to disassemble and move internal partitions significantly increases adaptability.

5.

PROPER SELECTION OF MATERIALS AND CONSTRUCTION ELEMENTS

Materials such as brick, wood, steel, can easily be reused and restored, as opposed to materials such as cement and concrete.

6.

DURABLE STRUCTURE

It makes it easier for additional floors to be added and for new systems – such as green roofs or photovoltaics – to be introduced.

7.

THE BEAUTY OF DESIGN

If the users like the final building, they will keep it in good shape, and in the future they will fight for it to be reused and adapted.

8.

REDUCING THE COMPLEXITY OF BUILDINGS

By minimizing the number of components and using modules, you can simplify the partial or complete disassembly of the building and other alterations.

9.

REGULARLY SPACED STRUCTURAL ELEMENTS

They make it easier to create a new utility layout.

10.

UNCOVERED COUPLINGS

Making connecting elements physically accessible makes it easier for future owners to check whether disassembly is possible and determine how to go about it.

11.

MECHANICAL FASTENINGS INSTEAD OF GLUE

The use of glue can lead to the deterioration of good materials. Using mechanical connecting elements such as screws, makes it easier to separate components and makes disassembly faster.

12.

SEPARATED SYSTEMS

This allows for the mechanical, hydraulic, electric, and other systems within the building to be removed or improved without affecting other installations.

13.

COMPREHENSIVE & COMPREHENSIBLE DOCUMENTATION

Maintaining a detailed documentation makes it easier for future owners and designers to examine their options vis-à-vis the building's flexibility and adaptability.

● is also one of the deconstruction strategies

source: Sidekix Media, Unsplash





source: Rumman Amin, Unsplash



deconstruction strategies

1.

MATERIAL PASSPORT

A document that certifies various information regarding materials, components, and products used in the building, making it easier to reuse them in the future.

2.

DISASSEMBLY PLAN

Creating a comprehensive survey of adopted deconstruction strategies will make the task of the future owners easier.

3.

REPEATABILITY

To facilitate the process of deconstruction, it pays to use similar kinds of wood and metal, and as many elements of identical size as possible.

4.

HIGH QUALITY MATERIALS

They are more durable and therefore have a higher market value following disassembly. Their high primary cost also means that, as a rule, they will be better maintained.

5.

NON-TOXIC MATERIALS

Dangerous materials are harmful to the environment and unfit to be reused. Using mixed materials also makes it difficult to identify those that can be used again.

6.

SIMPLICITY OF SYSTEMS

Avoiding complicated composite systems that combine more than one kind of material will make the disassembly and sale of materials easier. Far-reaching standardization throughout the project is also helpful.

based on: The American Institute of Architects, Building that last: Design for adaptability deconstruction and reuse, 2020; ChemEurope.com, Deconstruction, <https://tiny.pl/w8xqg> (accessed on: 24th February, 2023).

deconstruction

Deconstruction, i.e. the option of disassembling a structure piece by piece, avoiding any damage to its components, also plays an important role in making buildings circular. It allows the elements of a building to be reused in various contexts, and serves as an alternative to classic demolition, which is faster, but generates a significant amount of waste. Deconstructions are only performed towards the end of a building's life cycle, and can be partial, serving as a prelude to adaptation or reconstruction and greatly accelerating the whole process.

Deconstruction is usually split into two categories: non-structural and structural. Non-structural deconstruction, known also as soft-stripping, consists of the reclamation of materials such as doors, windows, and finishing elements. Structural deconstruction refers to the disassembly of the structural elements of the building ²².

In a traditional residential building, ca. 25% of used materials can be reused, and up to 70% can be recycled ²³. These values can go even higher if we enter the design process with deconstruction in mind. Some of the recommended solutions are in line with those encountered in adaptive architecture, which allows us to kill two birds with one stone, and thus do an even better job at preparing the building for changes in the future.



source: Milivoj Kuhar, Unsplash



Growing interest in environmental protection and the pursuit of sustainability is affecting many areas of our lives, including the construction sector. It has become a priority to create buildings that are not only energy-efficient, but also compatible with circularity.

In this context, the production of building materials from perlite is gaining increasing recognition worldwide. Perlite's unique properties make SYSTEM 3E perfect for construction.

Walls erected using this technology are characterized by high thermal and acoustic insulation, which reduces energy loss in buildings. This translates into lower energy requirements for heating and cooling, which is important for achieving a sustainable energy balance. 3E has a closed product life cycle, and can be recycled at the end of its use, reducing waste and environmental impact. This allows us to create buildings that are energy efficient, provide high comfort for their residents, and to minimize their adverse impact on the environment.

The availability of technologies like SYSTEM 3E on the market is an important step towards sustainable development in the construction sector. It is an investment not only in quality, but also in environmental protection and a better future for our society.



Patryk Bolimowski
Head of R&D w SYSTEM 3E

dotting the i's and crossing the t's in your demolition



Elżbieta Rotblum
sustainability expert at
office company Skanska
for Central and Eastern
Europe:

A high-rise building from the 1990s stands at 15 Jana Pawła II Av. in Warsaw. In its place, office company Skanska intends to build a new building. Why demolition instead of modernization?

Elżbieta Rotblum: The building does not meet contemporary occupational health and safety standards, including fire safety. It is also lagging behind in terms of workmanship. Investing in its upgrade will not allow us to make optimal use of such an important space in the center of the capital. In addition, when designing a new building, we select highest quality materials and solutions, which will make the finished product easy to maintain and adapt to the changing needs of its users. Thus, we contribute to the creation of a timeless property that is safe for its users and prepared for their changing needs, as well as emergency situations such as a pandemic.

We want to conduct the demolition in a way that will allow us to recover as many materials as possible. We want to donate some of them to charity and reuse them without further processing. The rest will be recycled and then reused both in our investments, including the new building to be constructed on this land, and in outside projects. Our goal is clear – to limit the amount of waste that ends up in landfills, and to take maximum advantage of existing materials recovered from the demolition.

Demolishing an over 100 meter tall building, with 22 floors above ground and 3 underground, surrounded by other structures, and located downtown – that sounds ambitious. What is your plan?

We have been preparing for this project for quite some time. Conducting a thorough inventory of the building by 3D laser scanning using a handheld laser, and BIM modeling from a point cloud, allowed us to create a 3D model of the building. This model will help us map various materials and then track their reuse – be it as part of Skanska projects, or outside ventures. It will also help us chart out and visualize the whole demolition process. Thus every stage, no matter how minute, will be meticulously planned, taking into account noise prevention and other challenges we might face. What's more, our desire to recover the materials in the best condition possible will make this a much "calmer" process than traditional demolitions. Not to mention the fact that the downtown location and Skanska's rigorous work safety standards mandate that we make it as easy on our neighbors as possible.

Do you have any prior experience in this arena?

Our office buildings are built on brown-field plots, i.e. developed land, frequently with pre-existing buildings that need

to be demolished. We don't build on greenfield land, and less than 5% of the waste from our construction sites ever ends up in landfills.

We also have significant experience in implementing the principles of circular economy in other markets. In our mother company's country, Sweden, we have launched the wonderful Hyllie Terrass project, in which we are not only using recycled steel, but have also created timeless functional furniture with a very high level of design using waste from construction and furniture production. The abovementioned furniture, including a reception counter, sofas, desks, and bar stools, has been placed in the building's public atrium.

Have you had the opportunity to implement the principles of CE during existing office space investments in Poland?

Yes, numerous times. For example, while constructing the Centrum Południe office complex in Wrocław, we used concrete, steel, aluminum, glass, and glass wool from recycling. In this instance, they were used for foundations, facades, and garages, among other things. They are also used to create cavity walls, the underground structure, the aboveground structure, the steel structure, façades, steel doors, fire doors, or fire and high-speed gates. Another example is the



source: Skanska

Nowy Rynek complex in Poznań, where recycled materials were used to create cavity walls, the building's structure, insulation, the façade, and gates. Concrete and steel containing recycled materials were also used in our P180 office building in Warsaw. I should also note that, staying true to the spirit of sustainable development, we are sourcing our construction materials locally.



source: Skanska

you can make money on savings – modernizing the power grid in a shopping center

The modernization performed by JW+A in one of Bydgoszcz's shopping centers is a good example of significantly reducing power use in a simple and non-invasive manner.

Commercial buildings are characterized by high energy consumption resulting from the need to provide comfort to a significant number of visitors. In case of typical commercial buildings, about 50% of total consumption is generated by the tenants, and the remaining 50% is generated by the building's ventilation, heating, refrigeration, and lighting systems. Preliminary analysis of a shopping center in Bydgoszcz showed that one of the most energy-intensive

systems in the building is ventilation. In response, JW+A experts have identified a set of solutions that are environmentally friendly and allow the facility owner to achieve significant savings.

First of all, it was necessary to determine whether the existing systems actually needed to operate at full capacity - says **Przemysław Rejczak**, Head of Energy and Building Performance at JW+A. Before the modernization, they were operating as if the facility was fully occupied at all times. The measurements we took clearly showed that demand for fresh air drops significantly during off-peak hours. So we focused on optimizing the operation of the ven-

tilation systems, and matching their performance to the estimated comfort level of users.

CO₂ concentration sensors were added to the existing system, and code was introduced to control the air handling units. A system that has been modernized in this way is able to autonomously measure air quality and automatically adjust the performance of the fans according to current demand, so as to maintain optimal parameters.

Another aspect JW+A's involvement in the project was advising on financing the investment. This consisted of obtaining white certificates, which are energy efficiency certificates awarded for any modernization aimed at reducing energy consumption. As a result, the anticipated financing will not only cover, but in fact exceed the total cost of the investment.

This modernization perfectly illustrates that you can make money on savings, says **Przemysław Rejczak**. By using a control algorithm, developed in cooperation with integrator **Lukasz Blinda**, we significantly improved energy efficiency by reducing heat demand, and the solution we proposed inspired the manager of the facility to introduce another, equally easy to implement solution, which resulted in additional savings in electricity consumed by the fans.

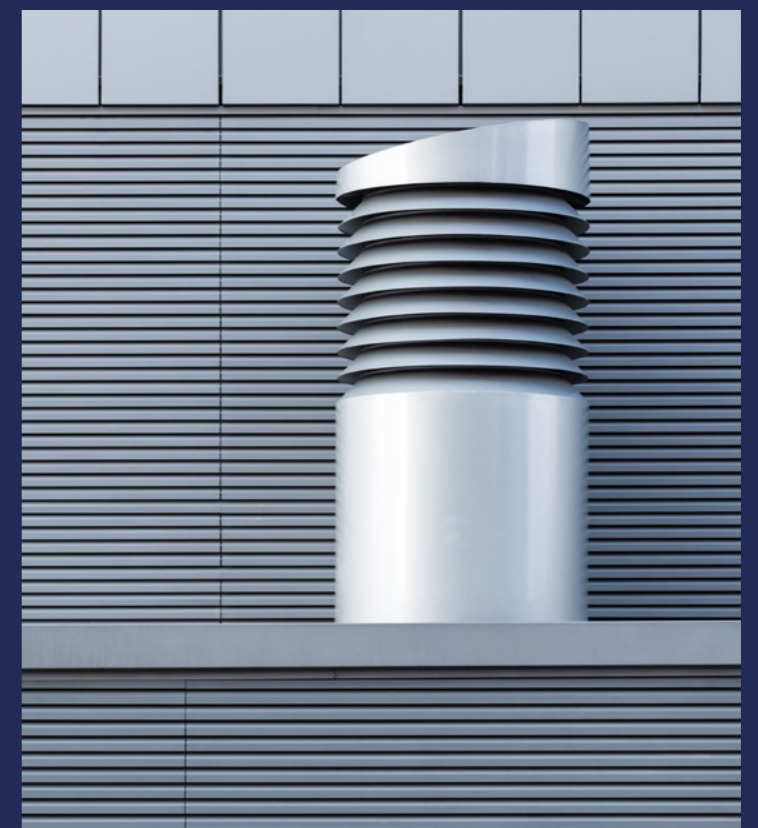
The process of improving the performance of air handling units involved optimizing the performance of 6 air handling units and an expenditure of PLN 30 thousand. However, the system's improved efficiency yielded annual savings of about PLN 50 thousand, and the subsidy obtained from white certificates will amount to about PLN 50 thousand. In addition, carrying out the optimization of fan performance by modifying the control algorithm led to further savings.



source: sandra barrera, unsplash



source: unsplash



source: pawel czerwinski, unsplash



circular buildings

source: Pawel, Pexels

5 circular from design to use

Circular buildings are objects designed, used, and reused without the unnecessary depletion of materials, environmental pollution, or degradation of ecosystems. Their technical components should be easy to dismantle and fit for reuse, and biological elements should be fit for reintroduction into the biological cycle.

construction is the key to circularity

Globally, the construction sector is responsible for 35% of energy consumption, 38% of energy-related carbon dioxide emissions, and 50% of resource consumption. And its growth isn't slowing down – if current trends persist, by 2060 the construction sector will double its total carbon footprint²⁴. In Europe, the situation isn't ideal either, with construction and demolition waste accounting for ca. 30% of all waste produced in the EU²⁵. It should be noted that in Poland, the growth in construction material consumption is ca. 30% above the EU average²⁶.

All of this leads us to a simple conclusion: we cannot increase the circularity of the economy without introducing far-reaching changes to the real estate market. This includes sourcing materials, transport, demolition, processing, and reusing construction waste, as well as all the other elements of the construction process. Just by designing steel structures that can be dismantled and reused, we can save 70% energy and reduce greenhouse gas emissions by 80% over the life cycle of a building²⁷.



source: Skanska

The global leader in construction material circularity is Switzerland. A 2021 survey showed that only 5% of primary materials end up in Swiss landfills²⁸. We find numerous examples of investments in the spirit of CE also in Denmark, the Netherlands, and Sweden²⁹. In Poland, there exist buildings that were partly constructed from reused materials, mainly in the commercial real estate sector, but for now they remain exceptions³⁰.

strategies of circularity

We can define four complementary strategies for designing circular buildings:

➔ **reduction** – in order to reduce the negative impact of CO₂ emissions on the environment, the first thing we need to do is try to avoid producing CO₂ by designing systems that require little energy to operate. At the same time, we have to keep in mind user comfort – reducing emissions shouldn't adversely impact the quality of the user experience.

➔ **identifying local synergies** – such as reusing construction materials or waste heat. Using already created materials – preferably ones that are already in the area and don't require much transport – is the foundation of circular economies, but it requires proper legislation and inter-sectional cooperation.

➔ **making prudent use of new resources** – whenever possible, circular buildings use energy, materials, and products from green sources. Preferably, they are sourced locally, which not only cuts down on transport-related emissions, but also encourages cooperation with neighboring entities.

➔ **managing the life cycle of a building** – here, we use knowledge about processes from the previous steps to make it possible for a building's users to wisely manage waste and control how resources are used³¹.



The revitalisation of Diuna office complex follows PineBridge Benson Elliot and Syrena Real Estate's modernization of the postmodern HOP office building at Chmielna Street. After the upgrade, it enjoys great interest from tenants, the local community and representatives of the world of culture and art, thanks to the program of artistic residencies.

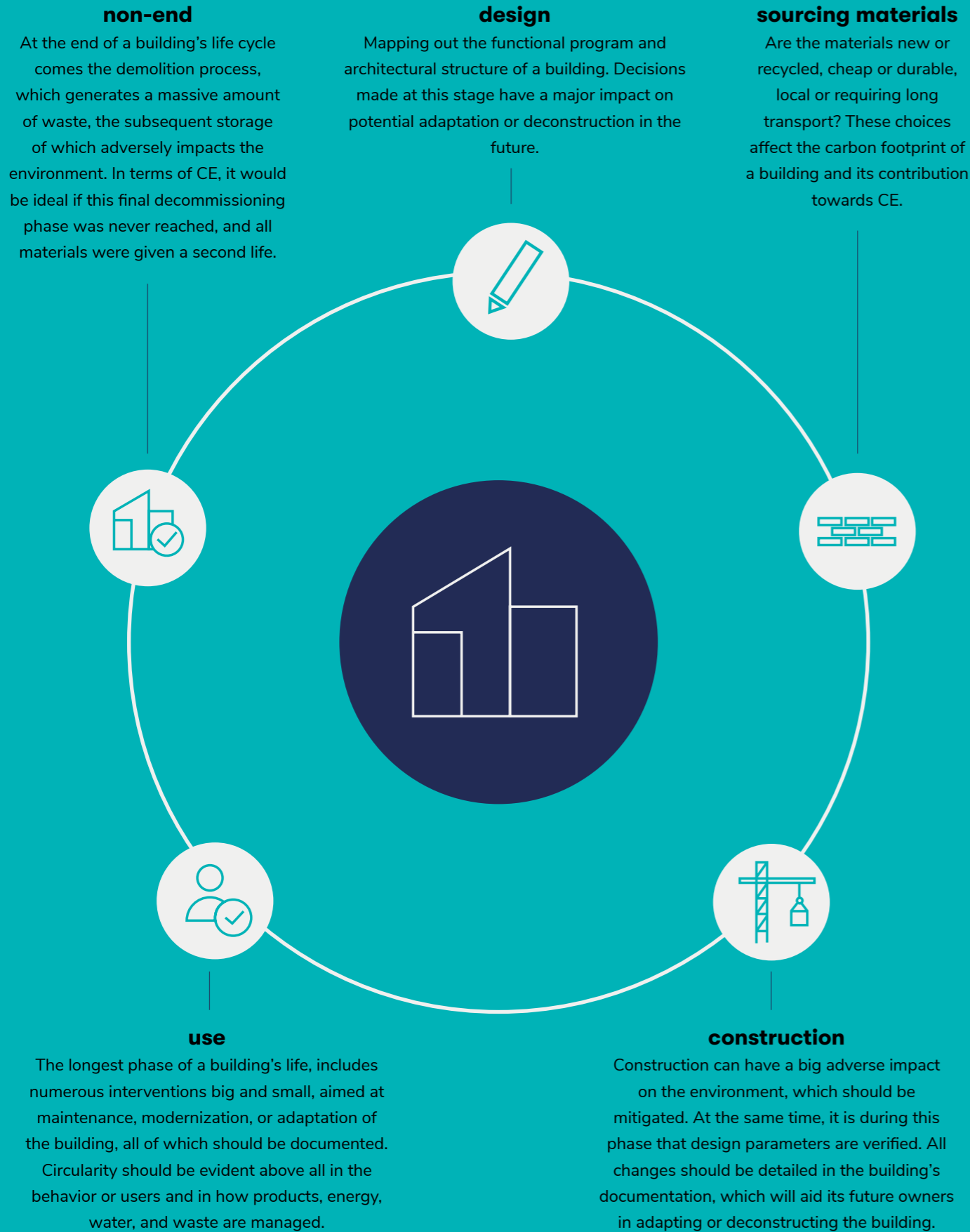
The very moment we encountered the Marynarska Business Park project in Służewiec, we were struck by its potential. We've had no doubt that we could change a lot about it for the better: minimise its environmental impact, make the complex more open to employees and the local community, make it more inclusive. We aim to significantly reduce our carbon footprint and improve the local ecosystem. We want to create an inclusive, productive and enjoyable working environment. That is why we have also decided on a new name for the complex - Diuna - which opens another, sustainable chapter of this investment.



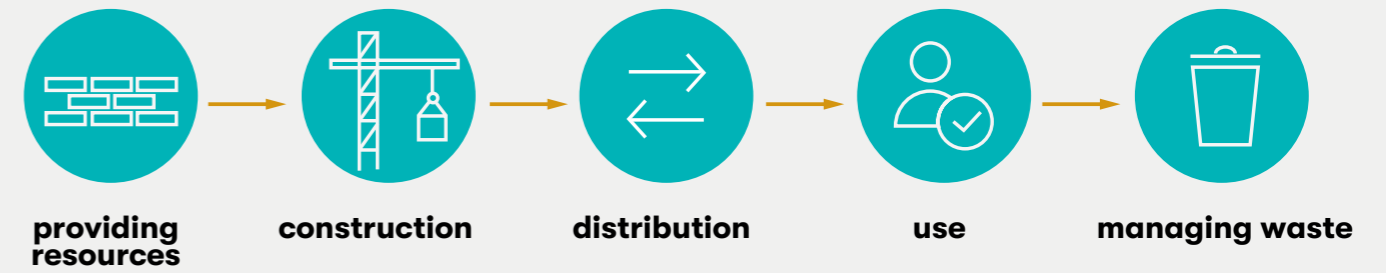
Stanisław Wardyński

director at Syrena Real Estate

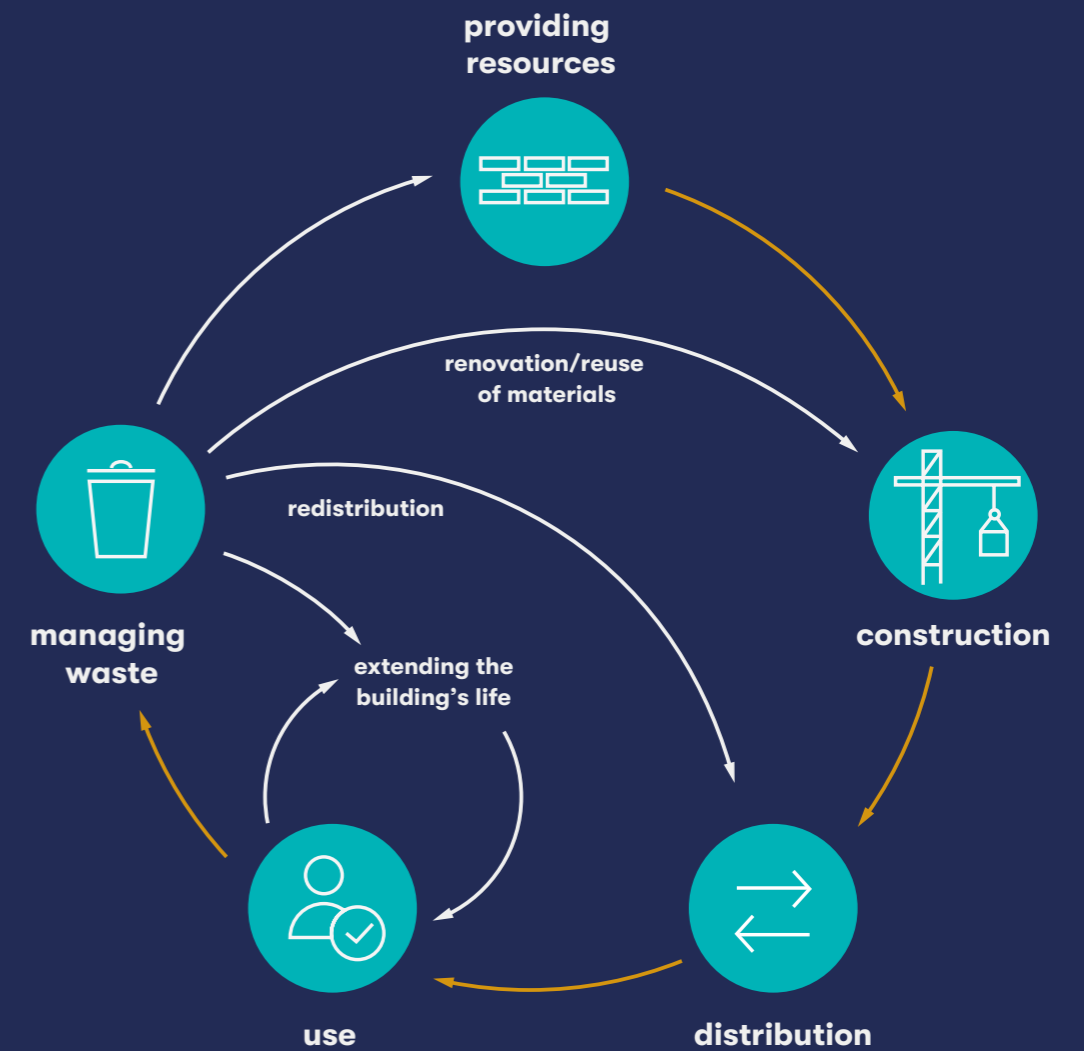
THE LIFE CYCLE OF A BUILDING



THE LINEAR MODEL IN CONSTRUCTION



THE CIRCULAR MODEL IN CONSTRUCTION



source: H. Bukowski, W. Fabrycka, Budownictwo w obiegu zamkniętym w praktyce [Circular Construction in Practice], INNOWO, Warszawa 2019. Budownictwo w obiegu zamkniętym w praktyce, innowo, Polish Circular Hotspot, 05.2019.pdf

Diuna - modernization in accordance with ESG

Diuna (formerly Marynarska Business Park) is one of the largest office complexes in Służewiec, with a usable area of nearly 46,000 sqm, which is undergoing modernization by PineBridge Benson Elliot and Syrena Real Estate. The project is implemented with particular attention to sustainability in accordance with ESG factors.

Environmental activities:

- The 6,000 sqm. concrete car park has been transformed into a green park – that will reduce the heat island effect, which will lower the local temperature near the buildings, thus saving the energy used to cool the space. It will also increase the thermal comfort of people using the park;
- 50 trees and 96 types of shrubs - native plants, relaxation zones and water installations have been put in place in the new courtyard. Green hills created to plant trees increase the green area,

which restores natural water retention and supports the microclimate;

- An energy audit carried out before the start of the modernization process resulted in the introduction of a number of solutions to improve the operation of building systems, e.g. ventilation control based on CO2 concentration, installation of VAV ventilation systems, air flow control and replacement of cooling units allowing for 22% energy savings according to models developed by JW+A;
- In addition, based on the efficiency study, a smart building control system is being introduced, to save up to 11.6% energy savings used by HVAC systems;
- Water consumption has been reduced by regulating flows in fittings in common areas, a leak detection and prevention system has been introduced, and a rain-water tank has been installed;
- Circular economy - during the audit of the complex, the possibility of reusing the building's finishing and construction

elements was assessed, along with the assessment of the built-in carbon footprint. All the greenery from the original square has been distributed to the tenants, some of the materials have already been re-used in the project, the remaining elements are waiting for a second life in storage.

Social activities:

- In the new courtyard, an open educational pavilion has been built, partly made of recycled elements, with a green roof covered with extensive vegetation;
- The newly created park has been opened to the district and is available to local residents and office workers;
- Diuna will be connected to the surrounding network of bicycle paths thanks to an internal bicycle route running through the patio;
- To promote zero-emission transport, a new infrastructure for cyclists with changing rooms, racks and repair stations has been created in the project;
- The spaces of the new conference center and the new patio of the complex will serve as a platform for cooperation with local partners, activists and the district;
- Art has appeared in the interiors of the lobbies in the new shared work space available to the employees of the complex;
- Thanks to cooperation with Fundacja Integracja, the complex will be inclusive and adapted to the needs of people with disabilities.

Certificates:

- WELL Health & Safety Rating;
- WiredScore Digital Connectivity Certification at the Silver level;
- The modernization process is based on BREEAM and WELL requirements and we will aim to obtain BREEAM in Use certificate in the new v6 system, the WELL certificate and white energy efficiency certificates.



source: Syrena Real Estate

source: Syrena Real Estate

6 building materials and furnishings

The main types of construction waste are: concrete, steel, brick, wood, glass, ceramics, and Styrofoam. Unfortunately, not all of them can be easily reused. Here is where modern technologies, inter-sector cooperation, and using materials from frequently surprising sources come to the rescue.

recycled materials

The most popular material for reuse are remains from demolished buildings in the form of **rubble**. Depending on its type, it can be used as a foundation for new buildings or sidewalks. However, recycled materials should be characterized by a high degree of uniformity. Composites make it difficult, if not impossible, to process materials, which is why **concrete**, for example, is so problematic. However, there is a way to reuse it after it's been properly crushed, and the proper technologies are already available on the market.

Wood also has high recycling potential if it is devoid of any substances used in processing. Wood is used to create new products, such as furniture or wooden composites. This material can also be reused as a source of energy, but in this capacity its potential is rather limited if we are aiming for sustainable development. It has been proven that wooden buildings have a smaller carbon footprints than their concrete counterparts, which points us to another potential direction for reusing this material ³².

As you can see, not all recycled materials yield the best results. Maximizing the use of by-products requires a comprehensive analysis. Sometimes the more cost-effective route will be to grind the

material down and use it for a completely different purpose³³. A good example of this is **glass**. For example, windows can be transformed into partitions. **Upcycling** and using construction components and furnishings in a new capacity is one of the most popular ways of improving the circularity of buildings. And so, window frames and doors can be used as floor or façade panels, or be turned into furniture.

material passports

Sometimes we lack information about the quality or the details of the production process of building materials. This information is important when materials are sourced from already existing buildings whose history we do not know. Lack of documentation, or its poor quality, significantly limits our access to reliable information about a given material. Here is where **material passports** come in handy. They are collections of information about the properties of products used during the construction of a building.

Their most popular current iteration is overseen by the Dutch foundation Madaster, which publishes information about all materials available to be extracted from buildings, making it easier to gauge their degree of toxicity whether they can be dismantled, and therefore also their potential for reuse. The BAMB



source: Skanska

source: System 3E

organization, which operates as part of the EU Horizon 2020 program, offers similar services. The passports authorized by BAMB specify the potential and value of reusable materials used in the construction of a building.

It is important to conduct a thorough inventory of secondary materials both before and after a building has been demolished. Proper identification of their measurements, qualities, toxicity, and function allows us to optimize their use in the future. BIM modeling and information gathered from so-called digital twins can be of much help in this process.

EXAMPLES OF SECONDARY BUILDING MATERIALS

- **RECYCLED CEMENT**
created from processing mixed granulate during a building's demolition
- **GREEN LOW-EMISSION CONCRETE**
produced from processed demolition waste
- **GEOPOLYMER CEMENT**
based on roughly processed natural resources or industrial by-products
- **WOOD**
recovered from construction elements, window frames, doors, and transport crates
- **RECYCLED STEEL**
100% recyclable, significantly reduces the new building's adverse impact on the environment

based on: Holcim, Cement, <https://tiny.pl/w8xgf> (accessed on: 13th March 2023); Sweco, Budownictwo o obiegu zamkniętym – szansa, której nie możemy zmarnować [Sweco, Circular construction – an Opportunity We Cannot Waste], <https://tiny.pl/w2zj6> (accessed on: 13th March 2023); Conserve Energy future, 17+ Sustainable and Green Building Construction Materials, <https://tiny.pl/w8xrf> (accessed on: 13th March 2023).



GOOD PRACTICES IN CIRCULAR CONSTRUCTION

- comprehensive assessment of the financial and environmental cost of renovation, as compared to demolition and reconstruction
- determining a carbon footprint limit that takes into account emissions from the entire supply chain – from extraction, through processing, to transport
- using light replacements of industrial materials that make it easier for them to be dismantled and transported in the future
- diversifying sectors from which secondary building materials are sourced
- implementing advanced technologies for segregating materials and planning said segregation
- avoiding composites that make it impossible to segregate materials in the future
- performing a life-cycle analysis (LCA) of building materials that includes environmental impact
- setting a minimum percentage of recycled materials in order to avoid downcycling, ex. percentage of crushed rubble in concrete
- requiring environmental product declarations (EPD) for key building materials
- cutting down on the transport of materials by using low-emission vehicles or a platform for trading materials locally



SELECTED METHODS OF SOURCING BUILDING MATERIALS

- advanced concrete crusher that separates the aggregate from other building materials in order to create new concrete
- processes for capturing CO₂ and converting it, along with water and reactive waste, into calcium carbonate
- systems for recovering gypsum waste using mobile technology, with subsequent certification of the secondary materials



SELECTED CONSTRUCTION MATERIALS CREATED IN OTHER SECTORS

- **CROSS-LAMINATED TIMBER (CLT)** - an innovative material made from forest waste, used for constructing light and durable pillars and panels
- **HEMPCRETE** - a light, durable, fire-resistant material used for constructing walls with thermal properties. Created from hemp fibers, water, and lime; there are also variants based on sand or rocks (sandcrete), peat and grass (grasscrete), or wood (woodcrete)
- **BAMBOO** - considered to be one of the best green construction materials, it has a very high self-regeneration rate and a very good durability to mass ratio
- **RICE BY-PRODUCTS** - ex. rice straw insulation plates, or plaster made from rice husks and natural lime
- **HAY BALES** - they have good insulation properties and can be used for soundproofing; hay is easy to pick and plant, and has a minimal impact on the environment
- **SHEEP'S WOOL** - its insulation properties are on par with those of conventional materials, it requires less energy to produce, and doesn't decompose as quickly as hay
- **FERROCK** - made using materials from recycling, such as steel dust from metallurgy. It's stronger than concrete and carbon neutral
- **INSULATION MADE FROM TEXTILE WASTE** - ex. from cotton, linen, hemp, or fibers from recycled artificial fabrics, used for example for soundproofing and insulation
- **BITUMEN SHINGLE** - made of processed paper, fiberglass, and asphalt, used for roofing
- **RECYCLED PLASTIC** - can be used ex. in concrete production, a mixture of processed and primary plastic is also used to create polymer wood

innovations that support the circular use of buildings

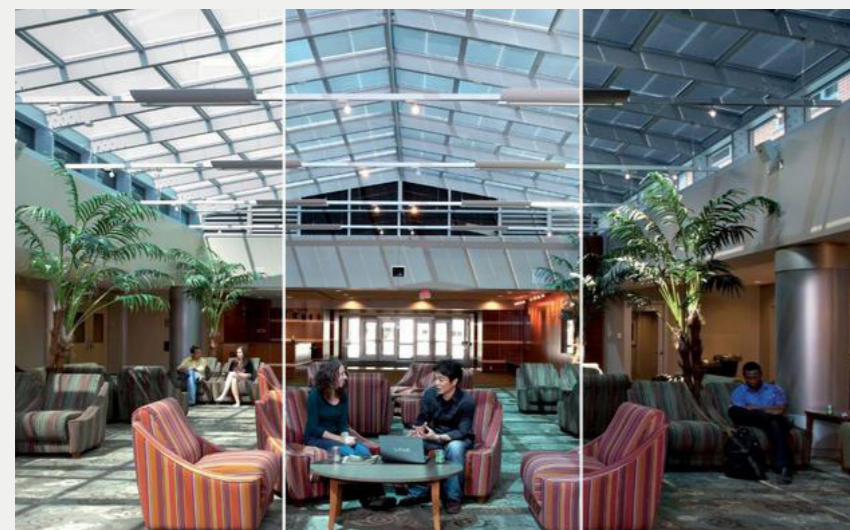
COOL ROOFS TECHNOLOGY

minimizes the heating up of roofs by using materials with proper solar reflectance and the ability to return absorbed energy. Reduces the need for air conditioning and reduces the roof's thermal tension, thus extending its life.



REMOTE PLUG LOAD CONTROLLERS

Give you access to sensors that gather data about energy and grid use in order to cut off power to idle or unnecessarily powered devices; also applies to secondary devices, ex. extension cords or UPSs. Reduces energy use by cutting down on redundancies.



INTELLIGENT ELECTROCHROMIC WINDOWS

Glass that can be tinted or made completely transparent, depending on your needs. Windows made from this glass optimize daylight use in a limited space and allow you to maintain a balance between comfort and savings resulting from reduced cooling needs.

source: press kit



DRY TOILETS

The so-called earthworm composting technology allow dry toilets to operate without access to power or sewers. It doesn't require maintenance and works without chemicals or water. The system is resistant to cold weather and doesn't get clogged.

BIPV MODULES

Building Integrated Photovoltaics are photovoltaic systems meant to be integrated into buildings and offering an alternative to traditional construction materials used in roofing or façades. BIPV modules not only allow you to collect solar energy, but also serve as an attractive visual addition to the façade.



TTES – WATER TANKS USED FOR STORING THERMAL ENERGY

Thermal Energy Storage (TES) allows you to store heat or cold for future use. This means that, for example, heat from the sun's rays collected during the summer can be used to heat the building during winter. TTES (Tanks of TES) serve as batteries. These systems are divided into long-term, which allow you to store heat or cold for several months, and short-term, which offer storage for up to a couple of days.

source: press kit

AN ALGORITHM THAT EXPANDS THE BUILDING'S EXISTING AUTOMATION

It allows you to manage heating, ventilation, and air conditioning processes, tailoring their parameters to a building's heating profile, the weather, or the number of people currently inside. This solution takes direct control over the existing BMSs (building management systems) and introduces optimal steering algorithms, reducing power use and bills.



SMART ROOF MONITORING

A system of roof deflection sensors that is equipped with a full technical diagnostic suite. It has built-in algorithms that allow you to adjust its functions to changing conditions, auto-correcting key parameters, and interacting with the user. Any detected irregularity is automatically corrected, and if the situation requires an intervention from the administrator, they are immediately notified about the issue.



PREFABRICATED PRODUCTS FITTED WITH SENSORS

They allow you to monitor the tension and deflection of construction segments, and thus identify potential defects at an early stage. The process of manufacturing the prefabricated products ensures their high quality, and fitting them with sensors greatly improves the administrator's control over the building's technical condition.

MULTI-FUNCTION PHOTOCATALYTIC PAINT

Thanks to a high concentration of photocatalytic materials, this paint help break down indoor air pollutants. It not only improves the quality of the air we breathe, but also slows down the accumulation of dirt on walls.



source: press kit



THE HYDROPHOBIZATION OF BUILDING FAÇADES

used primarily on brick and plaster façades, it protects the surface from moisture, wind, and the associated pollutants, by using water-blocking substances. Thus the material expels moisture instead of absorbing it, creating a characteristic water droplet effect on the façade.

SELF-REPAIRING CONCRETE

This special concrete contains bacteria that can create calcium carbonate to mend cracks and improve the material's durability. This technology could reduce the need for maintenance and repairs, which results in savings and extending the material's life. This is particularly important in case of concrete, because of how difficult it is to reuse it.



MIXED REALITY (MR)

Mixed Reality is a technology that combines augmented reality (AR) with virtual reality (VR). AR allows you to observe digitally generated objects in the real world. MR allows the user to interact with virtual elements while maintaining awareness of their real surroundings. The technology can be particularly useful during renovations.

source: press kit

we are in for a real revolution in our approach to green buildings



Jerzy Wójcik
Founder and CEO of JW+A consulting

What can we expect in the immediate future in terms of legislation on green solutions in buildings?

Jerzy Wójcik: The issue of the energy efficiency of buildings is currently being re-examined. An entirely new legislative landscape is being created which, in conjunction with the European Green Deal, will precisely regulate what energy standards will apply to office buildings over the next decade. In short: we are in for a real revolution, as opposed to the make-pretend one we've been seeing so far. Unless they react quickly, many companies stand to lose a lot. Not just due to the fees associated with not meeting the new standards, but also in terms of their market share.

Unrenovated buildings, in which modern technologies are not introduced or properly serviced, are like cars from 2010. You can drive them, some are quite good looking, but you can't really push them beyond 3rd gear, the air conditioning isn't great, and not everyone would want to use them to transport their children. Technologically speaking, there is a gap between them and current models. The top players in the market will not choose them for their fleet of vehicles.

Energy efficiency, then, is an important factor for tenants when choosing a facility?

Ecology is one of the decision-making criteria of most multinational corporations, which simply do not lease space in substandard facilities. This is due to their philosophy of reducing their impact on the environment. Not only that - they are keen on being able to actually demonstrate the effects of such actions in the form of concrete emissions figures. Therefore, modern business centers that attract large corporations must represent the highest possible standards in this regard. Otherwise, they may lose their strategic tenants in the near future.

When does a facility need a major renovation, and when does it just need a touch up?

There is no one-size-fits-all solution - it all depends on the energy specifications of a particular facility and the strategy adopted by its owner. There are also no models on the market that can be used as ready-made solutions. Some investors upgrade their office buildings every 8-9 years due to changes in regulations and modern technologies offering completely new possibilities. This approach certainly prepares you better for this „energy revolution,” as the costs of numerous minor renovations are both lower, and spread out over time, as opposed to an expensive and time-consuming energy overhaul done at the last minute, just before the regulations go into effect.



source: chuttersnap unsplash

Do the new EU regulations apply only to newly built properties, or also to existing buildings? For whom is this situation more difficult?

The regulations for existing buildings and those currently being constructed are not identical. In case of new buildings, the aim is to make them zero-emission. For existing buildings, minimum energy class levels will be allowed for residential, commercial, and public buildings.

Building new facilities will be more difficult with each passing year, and renovating existing ones will become both a legal and a market necessity, as they will have to compete with facilities with higher energy ratings. Therefore, investing money in renovations will simply pay off in the long run.

And where does JW+A stand in all this?

We recognize that climate transformation is not our clients' core business, so we plan our actions with an eye towards not committing too many of their resources, while at the same time enabling them to implement innovative solutions. Our mission is to allow our clients to achieve their sustainability and net zero emissions goals by using our expertise in innovation, technology, and process optimization to help them navigate the

coming revolution. We are focused on practical customer-oriented solutions. Thus, JW+A's mission includes not only an environmental, but also a business component - we impress on our clients that caring for the environment can be an important contributor to a property's commercial success.



source: Marius Teodorescu, unsplash

How does circular economy change the functions of real estate?

We prefer to see the world as relatively simple – particularly in real estate. People need apartments, so we build housing estates. They need workplaces, so we build offices. They have to shop somewhere and take care of their other needs, so we build services. If the apartments have sold and they're occupied, the offices have been rented, and the service establishments are busy, then we figure that we were right, and that it was precisely what the local community needed.

Our perspective changes drastically when we notice abandoned buildings. We'll often say that someone's made a

mistake, that they "didn't do their homework". Maybe no one needed an office in this area? After all, it's sitting empty. Or maybe a service establishment was doomed to fail in this location? Sometimes that's true.

However, there are also times when a building's function made sense and was popular at the time of its construction. Time not only ages properties, but also brings changes to society and the economy, sometimes causing specific functions to become obsolete in a given location. We feel that this issue should be investigated.

- At ThinkCo, we consider adaptations and conversions to be some of the most interesting segments of the real estate industry. Particularly when the property in question is not some defunct 19th century factory, but rather relatively new investments, which were immensely popular but a few years ago – notes Tomasz Bojęć, Managing Partner at ThinkCo.

We aid investors solve problems with buildings that are not operating properly. The first step in our collaboration is conducting a multi-faceted analysis.

During this process, we ask numerous questions about various aspects of the property, in order to better understand the root of the problem and to find a fitting solution.

- I. Would the initial function make sense if the property were of a higher standard? What would be the cost of increasing its standard? Let's take a look at a 1990s office building in Warsaw's Służewiec district – a perfect example of an investment that has evolved over time. Initially, it performed its function, and even by today's standards it is a relatively high class piece of real estate. However, bringing it up to par with A-class office buildings is practically impossible from a technical standpoint, or at the very least prohibitively expensive. In this situation, it's natural to try to look for a new function for the property and begin its conversion.
- II. What functions are missing from the area? Which ones would best fit the existing infrastructure? Is there a danger of the function being filled by another property in the neighborhood, ex. as a result of a different conversion? Answering these questions requires in-depth analytic work. cursory observation is not enough to determine such deficiencies, one needs to perform a thorough analy-

sis of the location and demographic factors. The abovementioned office building might get turned into a private dorm, a hotel, serviced offices, or a multi-function hybrid property.

- III. Which function would benefit the area the most, at the lowest cost of implementation, and therefore offer the investor a long-term, stable profit?



source: Vadim Babenko, unsplash



source: Thom Milkovic, Unsplash

strategic partners

JW+A

JW+A – JW+A is a leading consulting firm in the field of sustainable development, energy efficiency, building emissions, and ESG strategies for the real estate sector. We aid our clients in Poland, Mexico, and Europe in scaling their business in a conscious and responsible way. We support companies in meeting their sustainable development goals and executing their ESG strategies, increasing their market and investment value. Thanks to innovative and functional solutions, the buildings of our Clients meet the growing expectations of users and investors. They are people-friendly, environmentally neutral, and compliant with applicable regulations. They meet the highest global standards and are becoming future-proof.



SKANSKA

The office company Skanska is a leading office space developer in Central and Eastern Europe. We operate in four countries: Poland, Romania, Czechia, and Hungary. Thanks to our knowledge and long-term approach, we shape how people live, work, and establish relationships. Together with our clients, partners, and our experienced team, we create innovative and sustainable solutions that support a healthy lifestyle for the current and future generations. Our office projects are LEED and WELL certified, and our new investments in Poland are also certified as "Buildings without Barriers", meaning that they are adapted for use by people with various needs – including people with disabilities and parents with small children.



revive

Staying one step ahead of social change, finding the intersections of nature and society, showcasing solutions that allow people to enjoy a sustainable lifestyle, creating projects tailored to local communities. These are just some of the things Revive focuses on when implementing new investments.

Revive projects achieve the seemingly impossible. They are a combination of natural tranquility and city bustle, eco-friendly mobility and high-speed living, sustainable development and modern solutions.

Revive is committed to becoming carbon neutral by 2025.



SYSTEM3E®

SYSTEM 3E is a breakthrough solution based on 3E elements made of a natural raw material - perlite. The innovation of 3E lies in the combination of unique formulation, precise shape, and simplicity of application, which lets you quickly erect walls without using mortar or insulation. It is eco-friendly, economical, and energy efficient.

The production process of 3E elements is energy efficient and has been developed in accordance with the principles of sustainable development – with limited CO₂ emissions, and a threefold reduction of water consumption. These elements can also be fully recycled, and the processed raw material remains competitive in terms of durability and thermal insulation.



notes

- 1 United 4 Smart Sustainable Cities: A guide to circular cities, 2020.
- 2 Deutsche Gesellschaft für Nachhaltiges Bauen, Circular Economy Closing loops means being fit for the future, 2019.
- 3 Global Footprint Network, Ecological Footprint of Countries 2018, <http://bit.ly/3JcCqM3> (accessed on: 12th March 2023).
- 4 Circle Economy, Innowo, Natural State, The Circularity Gap Report – Poland, 2022.
- 5 Circle Economy, The Circularity Gap Report, 2023.
- 6 Circle Economy, Innowo, Natural State, The Circularity Gap Report – Poland, 2022.
- 7 PARP, Ocena zapotrzebowania na wsparcie przedsiębiorstw w zakresie gospodarki o obiegu zamkniętym (circular economy) [Assessment of support required by companies in terms of circular economy], 2020.
- 8 J. Wróbel, M. Sołtysik, Gospodarka o obiegu zamkniętym – szanse i wyzwania [Circular Economy – Opportunities and Challenges], Instytut Projektów i Analiz, <https://tiny.pl/w8xdq> (accessed on: 13th March 2023).
- 9 Official Journal of the EU, Commission Delegated Regulation (EU) 2021/2139 of 4th June 2021 amending the resolution of the European Parliament and of the Council (EU) 2020/852, <https://tiny.pl/wk4zw> (accessed on: 12th March 2023).
- 10 EC, REPowerEU, <https://tiny.pl/w4ng8> (accessed on: 12th March 2023).
- 11 EC, Directive of the European Parliament and of the Council on the energy performance of buildings (recast), <https://tiny.pl/wkkn5> (accessed on: 12th March 2023).
- 12 Gov.pl, National Plan for Energy and Climate 2021-2030, <https://tiny.pl/wkncz> (accessed on: 12th March 2023).
- 13 Council of Ministers, Appendix to Resolution no. 23/2022 of the Council of Ministers of 9th February 2022: Long-term strategy for building renovation, Warszawa 2022.
- 14 J. Douglas, Building Adaptation, Butterworth-Heinemann, Oxford, 2006.
- 15 Redshift by Autodesk, How adaptive reuse gives defunct buildings new leases on life, <https://tiny.pl/w8qzw> (accessed on: 20th February 2023).
- 16 Arup, Building Retrofit, <https://tiny.pl/w8qzg> (accessed on: 21st February 2023).
- 17 Dezeen, Merk X references nature for renovation and extension of Amsterdam's Groote Museum, <https://tiny.pl/w8qzj> (accessed on: 21st February 2023).
- 18 The Empire State Building, Constructing History, <https://tiny.pl/w8qzn> (accessed on: 13th March 2023).
- 19 Arup, Transform & Reuse, Low carbon futures for existing buildings, 2020.
- 20 D. Konieczna, Adaptowalność w architekturze reagującej na czynniki środowiskowe [Adaptability in Architecture in Reaction to Environmental Factors], Środowisko Mieszkaniowe, (22), 2018.
- 21 A. Manewa, C. Pasquire, A. Gibb, A. Ross, & M. Siriwardena, Adaptable buildings: striving towards a sustainable future, 2013.
- 22 ChemEurope.com, Deconstruction, <https://tiny.pl/w8xqg> (accessed on: 24th February 2023).
- 23 G. Bertino i in., Fundamentals of Building Deconstruction as a Circular Economy Strategy for the Reuse of Construction Materials, Applied Sciences, 2021.
- 24 WGBC, The Net Zero Carbon Buildings Commitment, <https://tiny.pl/w6h8c> (accessed on 1st April 2023).
- 25 KRN.pl, Recykling materiałów budowlanych – na czym polega i jak wygląda w Polsce? [Recycling of building materials – what is it and how does it work in Poland?], <https://tiny.pl/9gcr7> (accessed on 2nd April 2023).
- 26 Inzynierbudownictwa.pl, Eksport materiałów budowlanych-perspektywy na rok 2023 [Export of building materials – perspectives for 2023], <https://tiny.pl/w6qlj> (accessed on: 2nd April 2023).data:GUS, Eurostat, calculations: Santander
- 27 Krakow.p., Budownictwo do wielokrotnego użytku [Buildings for repeated use], <https://tiny.pl/w6q4t> (accessed on: 2nd April 2023).
- 28 RN, Recykling materiałów budowlanych – na czym polega i jak wygląda w Polsce? [Recycling of building materials – what is it and how does it work in Poland?], <https://tiny.pl/9gcr7> (accessed on 2nd April 2023).
- 29 Circle Economy, The Circularity Gap Report, 2022.
- 30 Bankier.pl, Budownictwo będzie bardziej eko. UE nakaże ponowne wykorzystanie odpadów budowlanych [Construction bound to go more green, the EU to enforce the reuse of construction waste], <https://tiny.pl/w8xmf> (accessed on: 13th March 2023).
- 31 INNOWO, Polish Circular Hotspot, Budownictwo w obiegu zamkniętym w praktyce, Warszawa 2019.
- 32 Climate-KIC, The challenges and potential of circular procurements in public construction projects, 2019.
- 33 C. van Oppen i in., Circular procurement in 8 steps, 2018. <https://www.ahmm.co.uk/projects/reuse/television-centre-bbc-studios/>

about us

ThinkCo is a consulting firm specializing in the real estate market.

We help implement strategies for this sector with the aim of creating better processes, products, and places.

ThinkCo is a team of analysts, strategists, and designers working in the fields of real estate, technology, media, and advertising. We design buildings, products, services, and brands based on in-depth research.

We offer design and consulting services, working on the most innovative investments in Poland. We combine the know-how of architects and researchers with experience in the business world in order to create better processes, products, and places. Our areas of expertise are:

- mixed-use teams
- the rental market (PRS, PBSA, coliving, senior housing)
- ESG
- architecture and urban planning
- market reports

ANALYSIS

We conduct research and analysis in an effort to understand the changes happening in the real estate market. We study the role of design in the development and creation of processes, products, and places.

- reports
- studies
- workshops

CONSULTING

We create and help implement strategies that allow you to run a successful business and to communicate authentically. We help not just plan new solutions, but also adjust existing ones.

- strategies
- insights
- consulting

DESIGN

We are an interdisciplinary team of specialists, which allows us to create both architecture and product design, as well as branding, brand communication, and UX and functionalities for digital services.

- audits
- guidelines
- architecture and urban planning

think
co



**Tomasz
Bojéc**

Partner

e-mail: bojec@thinkco.pl

tel. 791 527 266



**Przemysław
Chimczak-Bratkowski**

Partner

e-mail: chimczak@thinkco.pl

tel. 503 550 513

think
co

strategic partners:

JW+A **SKANSKA** **revive** **SYSTEM3E[®]**