

DREES & SOMMER GROUP

ANNUAL REPORT **2019**



**DREES &
SOMMER**

GROUP OPERATING RESULT 2019

PROFIT & LOSS STATEMENT

	(in euros)	
1. Revenues	363,081,459	
2. Change in work in progress	121,604,238	
3. Other operating income	15,451,796	500,137,494
4. Expenditure for purchased services	62,899,767	
5. Personnel expenses	287,978,966	
a) Wages and salaries	253,543,695	
b) Social security costs and pension fund	34,435,272	
6. Depreciation	8,358,166	
7. Other operating expenses	83,107,950	442,344,850
8. Income from shareholdings	-682,242	
9. Income from other securities and from long-term loans	284,197	
10. Interest and other expenses	693,367	-1,091,413
11. Operating result		56,701,231
12. Taxes on income and earnings	19,131,247	
13. Other taxes	338,424	19,469,671
14. Net income		37,231,561
15. Shares held by other shareholders		2,926
16. Profit brought forward less dividends		-217,938
17. Changes in equity as the result of purchase or sale of own shares		1,141,144
18. Group balance sheet profit		38,157,693

PROFIT & LOSS STATEMENT

Group sales grew by 75.2 million euros to 500.1 million euros (prior year 424.9 million euros). At 442.3 million euros, expenditure is up 65.1 million euros on the prior year figure of 377.2 million euros. The operating result increased by 9.0 million euros to 56.7 million euros in the period under report. Net income for the year is 37.2 million euros.

BALANCE SHEET

The transfer of the balance sheet profit of 38.2 million euros – together with subscribed capital, capital reserves and revenue reserves – results in equity of 73.0 million euros. Our equity ratio is 36.5%. Accruals for pensions, taxes and variable remuneration rose by 15.8 million euros to 82.8 million euros. Liabilities such as for Trade payables to suppliers and subcontractors increased to 38.3 million euros, up 5.1 million euros on prior year. Payments received on account of orders decreased by 1.9 million euros to 6.5 million euros due to invoice timing. In 2019, the company issued profit participation rights to employees. These are shown as loans totaling 3.7 million euros.

This results in a balance sheet total of 199.7 million euros for fiscal 2019 (prior year 165.6 million euros).

BILANZ

	(Angaben in Euro)	
AKTIVA		
A. Fixed assets		
I. Intangible assets	14,333,429	
1. EDP software, licenses	5,302,824	
2. Good will resulting from capital consolidation	9,030,605	
II. Tangible assets	32,098,651	
1. Land, rights equivalent to real property rights, and buildings	8,885,935	
2. Other assets, operating equipment, fixtures and fittings	16,828,632	
3. Payments on account and tangible assets under construction	6,384,084	
III. Financial assets	3,033,620	
1. Shareholdings	1,453,932	
2. Other securities lending	1,579,687	
B. Current assets		
I. Inventories	0	
1. Work in progress	671,723,267	
./. Advances received	-671,723,267	
II. Receivables and other assets	92,340,685	
1. Trade receivables	75,968,426	
2. Receivables from shareholdings	304,486	
3. Other assets	16,067,773	
III. Securities	9,970,550	
1. Other securities	9,970,550	
IV. Checks, cash on hand, cash in banks	43,746,842	
C. Deferred income (other)	2,714,009	
D. Prepaid taxes	1,503,000	
E. Positive difference from asset allocation	0	
Balance sheet total	199,740,786	

	(in euros)	
PASSIVA		
A. Equity		
I. Subscribed capital	13,222,286	
less nominal value of treasury shares	-333,106	
II. Capital reserves	23,044,470	
III. Revenue reserves	98,104	
IV. Net income	38,157,693	
V. Change in equity due to exchange rate difference	-609,112	
VI. Minority interests	-575,328	
	73,005,007	
B. Accruals		
1. Accruals for pensions	3,385,244	
2. Provisions for taxation	9,780,373	
3. Other accruals	69,612,982	
	82,778,599	
C. Liabilities		
1. Bonds	3,700,525	
2. Liabilities to financial institutions	0	
3. Payments received on account of orders	1,938,749	
4. Trade payables	17,736,689	
5. Liabilities to shareholdings	179	
6. Other liabilities	20,533,937	
	43,910,079	
D. Deferred income (other)		
	47,101	
Balance sheet total	199,740,786	

500.1
MILLION EUROS
SALES

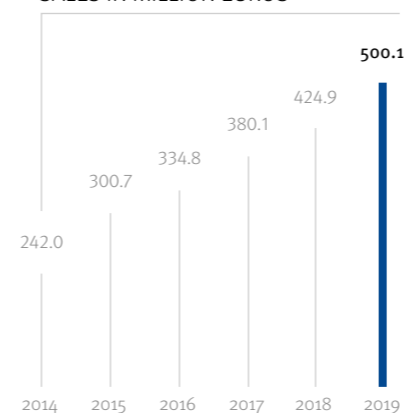
56.7
MILLION EUROS
OPERATING
RESULT

36.5 %
EQUITY RATIO

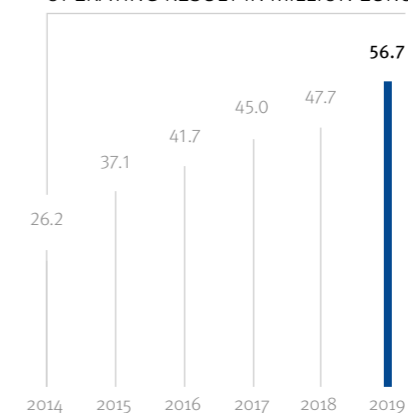
3,820
EMPLOYEES

46
INTERNATIONAL
LOCATIONS

SALES IN MILLION EUROS



OPERATING RESULT IN MILLION EUROS



GROUP OPERATING RESULT 2019

500.1
MILLION EUROS
SALES

56.7
MILLION EUROS
OPERATING
RESULT

36.5 %
EQUITY RATIO

3,820
EMPLOYEES

46
INTERNATIONAL
LOCATIONS

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OBERSTDORF

Extensive construction work is proceeding at full tilt to upgrade the ski jumping stadium and the cross-country skiing center in Oberstdorf. Drees & Sommer is supporting the client with the coordination of costs, schedule, and more than 100 contractors.

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Projects such as rails systems and railway stations are always executed under extreme time pressure. Infrastructure experts from Drees & Sommer meet this challenge with two innovative approaches.

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As the world's largest consumer of raw materials, the construction and real estate industry needs to make changes. Cradle to Cradle® is not only the path to regenerative buildings and products, but also the key to a livable future.

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Becoming climate positive is just the first step. Clear measures for further reductions in CO₂ emissions are also defined in Drees & Sommer's blue way concept. These include social and societal involvement.

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The Federal Ministry for Economic Cooperation and Development (BMZ) is to become the first climate-neutral federal authority in Germany.

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The Real-Estate-Consulting team at Drees & Sommer examined the nearly 50 properties in the vendor's portfolio on its behalf, and provided advice on the transaction.

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What is now the tallest building in Luxembourg was completed on schedule and within budget as part of the CJEU's fifth expansion stage.

REPORT OF THE SUPERVISORY BOARD

In partnership with clients, Drees & Sommer was able to successfully conclude numerous projects and start some exciting new ones in fiscal 2019.

During the 2019 financial year, we fulfilled our Supervisory Board tasks in full compliance with statutory requirements, the Articles of Association and rules of procedure. At the meetings of March 7, 2019, May 13, 2019, October 17, 2019 and December 5, 2019 we discussed the Executive Board reports, the development of the company, and strategic issues against the background of general economic conditions. In addition to the meetings of the Supervisory Board, the Chairman of the Supervisory Board conferred with the Executive Board every three weeks.

As the result of prevailing conditions in 2019 and good corporate governance, Drees & Sommer sales exceeded the half-billion euro mark for the first time. Pre-tax profit increased by €9.0 million to €56.7 million, while equity rose by €17.9 million to €73.0 million. These results are particularly important in view of the situation in 2020. The existential threat from business operations was not foreseeable.

Annual and consolidated financial statements 2019

The annual financial statements and the consolidated financial statements of Drees & Sommer SE were prepared by the Executive Board in accordance with the provisions of the German Commercial Code (HGB). Baker Tilly – appointed by the Annual General Meeting as Auditor – audited the 2019 annual financial statements and the consolidated financial statements, including the management reports. Baker Tilly performed the audit in accordance with article 317 HGB (German Commercial Code) and in compliance with the auditing principles issued by the German Institute of Public Accountants (IDW). The annual and consolidated financial statements were approved without reservation.

The annual financial statements and management report, the consolidated financial statements and group management report, the Auditor's reports, and the Executive Board's proposal

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“Things don't always turn out the way you expect. But Drees & Sommer will master the impacts of the pandemic through its own efforts.”



Prof. Dr. Hans Sommer
Partner und Chairman of the Drees & Sommer
Supervisory Board

for the appropriation of the net income of Drees & Sommer SE were made available to all members of the Supervisory Board in a timely manner.

We examined these documents and discussed them during our videoconference on May 14, 2020, which was joined by the Auditor. We duly approved the Auditor's reports. At our meeting on May 14, 2020, we approved the annual financial statements, the consolidated financial statements, and the management reports prepared by the Executive Board. We discussed and approved the Executive Board's proposal that the net income of Drees & Sommer SE of €38.2 million – as well as the amount allocatable to own shares held by the SE – be carried forward to new account. In making this decision, the current economic situation as a result of the coronavirus Covid-19, the current financial and earnings position of the company, medium-term financial and investment planning, and the interests of shareholders were taken into account.

We also passed our proposed resolutions for the Annual General Meeting. There were no changes to the makeup of the Executive Board or the Supervisory Board during the year under report.

Outlook for the next financial year

The Executive Board – in cooperation with the senior executives and in consultation with the Supervisory Board – has taken financial and personnel measures and introduced weekly reporting with the aim of mastering the impact of the pandemic as far as possible through our own efforts and without the need for redundancies.

Stuttgart, May 14, 2020

Hans Sommer

The Drees & Sommer
Supervisory Board comprises
Chairman Prof. Dr. Hans Sommer (in the picture),
Vice Chairman Dr. Johannes Fritz,
Eva Dietl-Lenzner, Ulrich Dietz,
Dr. Bernd Gaiser and Volker Mack.

REPORT OF THE EXECUTIVE BOARD

Following the good operating results of previous years and a very strong fiscal 2019, Drees & Sommer is mastering the challenges of COVID-19. In this interview, Executive Board members explain why the strategic investments of previous years are now paying off, and the priorities the company will continue to set.

With sales of half a billion euros and growth of 18 percent, you are looking back at an exceptionally successful fiscal 2019. To what extent do you attribute the result to the very favorable market conditions last year and the long-lasting real estate boom?

Steffen Szeidl: There is no doubt that the entire industry and we as a company have benefited from the strength of the markets. But our growth is mainly due to us increasingly offering our customers single-source execution models that include management, planning and construction

implementation know-how. Customers have rewarded the fact that we have been able to meet growing demand – especially with regard to digital and sustainable solutions. And this is reflected in our operating result.

Dierk Mutschler: We look back on a real estate boom that has lasted more than ten years. But anyone who says that a rising tide lifts all boats must also ask whether this trend and full order books may have led some to underestimate the incredibly high speed of the digital transformation and to overlook the enormous pressure for change. The



Executive Board members and partners from left: Dierk Mutschler, Steffen Szeidl

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„A (climate-)positive
outlook.“

coronavirus pandemic has now brutally revealed which boats have leaks. And it's a virus, of all things, that is now forcing the world to become more digital.

And has the virus also forced Drees & Sommer to become more digital?

Steffen Szeidl: We focus on becoming more digital every day. We have been fostering our innovation culture since our foundation in 1970 – it's part of our DNA. We create innovative and customized solutions for our clients, and focus on our users' needs. We are not afraid to spend money on this, and have long been investing in digital processes and methods. This applies both to the services we offer our customers and to our internal processes. And this approach is backed up by our shareholdings. In 2019, we enhanced our expertise with the acquisition of the digital construction company digitales bauen GmbH. We also strongly promote our employees' digital know-how, participate actively in joint research projects, and work closely with startups in relevant programs.

Dierk Mutschler: We can say with confidence that the vast majority of our staff were able to continue working during the lockdown. More than 4,000

colleagues can work completely digitally from home at the same time – and have been able to do so for a long time, not just since the coronavirus pandemic. Customer appointments are now completely virtual, wherever possible. And we have rapidly and flexibly converted our range of services to meet our customers' urgent needs.

Ability to work is one thing, customer demand another. Has there been demand for services despite the lockdown?

Dierk Mutschler: Yes, because for one thing, most construction projects are still continuing. But also because there has been strong demand for controlled shutdown of projects, management of vacant properties, and, of course, restart and recommissioning. We have also managed construction site shutdowns – which thankfully have remained rare – and found ways to overcome personnel, material and schedule bottlenecks. One keyword in this context is digital LCM – Lean Construction Management – a digital platform for optimizing construction processes. There is also demand for Remote Desktop Due Diligence. This involves undertaking purchase due diligence without an on-site inspection – or at most with a quick inspection.



*Drees & Sommer unites opposites
to create a world we want to live in.*

Drees & Sommer turns 50: Find out in our image film how the spirit of five decades carries us into the future!

How did you manage to adapt your services so quickly?

Steffen Szeidl: The digital ideathon we launched together with our colleagues is one of the ways. Initiatives like that keep us agile and flexible. Employees have submitted 50 concepts as a result of the ideathon alone. These range from the revitalization of decommissioned hospitals and the conversion of exhibition and sports halls to container solutions for country doctors with fully equipped treatment rooms for COVID-19 patients.

So the best ideas don't (only) come from management, but from employees?

Dierk Mutschler: Yes, that's why we promote flat hierarchies. The ideas to solve acute social problems and the enthusiasm for our anniversary year initiatives show us that we have the full backing of our employees and that we are on the right path to becoming a Beneficial Company. We look back on five outstanding decades with countless successful projects. Instead of staging an exclusive and costly self-celebration, we are putting our sustainable principles into practice and giving something back to society in the form of 50 ecological and social projects over 50 weeks of our anniversary year. We provide the platform and the strategy, but it would all amount to nothing without our employees' ideas.

What exactly is a Beneficial Company? Does it involve sustainability and social measures?

Steffen Szeidl: Sustainability and climate protection are certainly key components. In other words, it involves reducing our company's carbon emissions to the greatest possible extent, supporting afforestation projects, and promoting biodiversity and recyclable products. But a Beneficial Company is not solely focused on economic success, but also on the greatest possible benefit for the environment and society. So it is also characterized by a high degree of social engagement and commitment to sustainability. Cost-efficiency, ecology and responsibility are inseparable for a Beneficial Company. In short, a Beneficial Company gives more back to the environment and society than it consumes itself.

How close have you come to your goal or is it still a vision?

Dierk Mutschler: We practice what we preach, of course. We are proud that we have reduced and offset our carbon emissions to the extent that we are now climate positive. Although carbon credits currently make a significant contribution to achieving this, we will continue to reduce our offsets. For example, for the last eight years all our German offices and charging stations have been powered by electricity from renewable energy sources. We have switched our vehicle fleet to alternative drives,

encourage the use of environmentally friendly vehicles with a carbon bonus, and provide our colleagues with local public transport subsidies as well as shuttle-bus, job-bike and car-sharing services.

Steffen Szeidl: And our promotion and practice of innovative, future-oriented concepts such as Cradle to Cradle® and Blue City contribute to advancing our vision of a positive and sustainable future, both for our projects and our company. Take construction projects for our own needs, for example. Our new office building at the company headquarters in Stuttgart is designed as an energy surplus building and generates more energy than it consumes in operation. This is achieved with a facade featuring photovoltaic panels and greening, and through the use of geothermal energy. We also minimize resource consumption and waste generation.

That's all well and good, but how can companies afford the additional cost of environmental and climate protection, especially in view of the unpredictable consequences of the coronavirus pandemic?

Steffen Szeidl: It has always been a fallacy that sustainability and cost-effectiveness are mutually exclusive. Especially now, when companies have to think twice about every euro they spend, it is essential that we don't stop investing in the future. Clever combinations of sustainable and digital solutions always lead to better products and services, and to greater competitiveness – which in turn attracts highly qualified employees. This applies both on a small and a large scale. We are entrepreneurs and take a long-term view, and sustainability always wins in the long term – from a financial perspective, too.

So the whole industry has to become greener?

Steffen Szeidl: Absolutely! Despite criticism from some lobby groups, the EU Commission's Green Deal and well-balanced and forward-looking innovation promotion should go hand in hand. This could provide strong cross-industry support to companies developing new technologies. A recovery budget of €120 billion per year for the next ten years would be necessary to achieve this and would give a considerable boost to the


post-crisis relaunch of the European construction industry, its suppliers in the machine-building and vehicle sectors, and related industries. This would not simply be an economic stimulus package, but rather a far-reaching sustainability model that could also serve as an example for other regions of the world, while at the same time serving the interests of future generations.

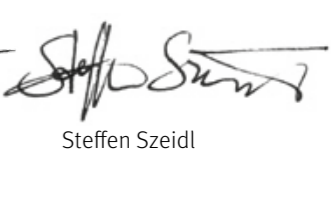
Apropos stimulus packages and the future – what do you expect and how have you positioned Drees & Sommer?

Dierk Mutschler: The old adage applies here: When you restart a motor, it initially runs at low speed. It is undisputed that the currently prevailing general conditions are onerous. Many companies' balance sheets have gone from profit to loss, liquidity has evaporated, and some construction and infrastructure projects have been deferred. These are not the ideal conditions for this year and next. But despite these difficult baseline conditions, we are confident that the economy will bounce back and pick up speed again after a lengthy start-up phase. The sooner, the better.

Steffen Szeidl: Our good company figures for 2019 and previous years provide us with a good cushion against the further impacts of the current crisis. All Drees & Sommer projects will continue to start with a digitization and sustainability strategy. As part of our Vision 2025, we have been focusing for some time now on the key factors that have proven themselves. We focus on our customers, thus driving market demand and promoting trending topics. And we can only continue to do this with our innovative and dedicated employees, to whom we would like to express our sincere thanks for the successful financial year and their exemplary commitment. With our strong team, we will continue to implement inspiring customer projects to ensure a livable world that is fit for our grandchildren.

Stuttgart, 14th May 2020


Dierk Mutschler


Steffen Szeidl

ARTIFICIAL INTELLIGENCE: EVOLUTION OF WORK?



Digital transformation, computer programs and algorithms are penetrating further and further into our daily lives. With artificial intelligence we have, waiting in the wings, a form of technology that could change what it means to be human. But what does it mean for society and for companies?

It took Homo sapiens around 300,000 years to reach the industrial era. After that, everything changed very quickly: no more than 86 years passed between the First Industrial Revolution in 1784, when the steam engine was invented, and the discovery of electricity and the introduction of assembly line work which led to the Second Industrial Revolution.

Both historical turning points involved huge upheavals in society and the world of work. Another 100 years later, around 1970, a third industrial revolution began with the emergence of information technologies and digital processes. Interestingly, 1970 was the year in which the company that is now Drees & Sommer SE was established, and we were among the pioneers in the use of digital methods and technologies.

Now, in 2020 – 50 years later – there is talk of a fourth industrial revolution, triggered by artificial intelligence (AI). The term artificial intelligence was actually coined in 1955 by the U.S. computer scientist John McCarthy. By 1966, several attempts had been made to develop the concept further. None of these met with any success, and AI went into a type of 'hibernation' until 1997. That year, spectacularly, IBM's Deep Blue computer succeeded in beating world chess champion Garry Kasparov. In 2011, Apple released Siri, the virtual assistant with a speech recognition function, for the iPhone 4S. In the same year, the IBM

supercomputer Watson won the complex quiz show Jeopardy! on U.S. television. The last well-known dramatic example occurred in 2017 when Google's AI program, Alpha Go, beat Lee Sedol, the world champion several times at the complex board game Go.

Nowadays, the term artificial intelligence is on everyone's lips, but it is often incorrectly associated with human intelligence. Yet the two are fundamentally different from each other. Even 10 or 20 years from now, machines will not possess consciousness or free will. Yet, supported by artificial intelligence, computer systems can already achieve amazing things. Algorithms have been outperforming humans at image recognition for a long time. Translation programs, which are continuously optimizing themselves, are calling into question the future of interpreters and translators. AI systems are also producing works of art of which even the Old Masters would be proud. They can also develop their own artistic directions.

Applications using artificial intelligence are finding their way into many other areas of our lives. To some extent they are contributing to further progress in science and technology. One of their benefits is simply that they can make our everyday life easier. We come across this technology when we read product recommendations on Amazon or when digital assistants such as Alexa play particular pieces of music for us on command.

FIRST

INDUSTRIAL REVOLUTION

First mechanical manufacturing plants, powered by water or steam; power loom



1784

STEAM ENGINE

SECOND

INDUSTRIAL REVOLUTION

Introduction of mass production based on the division of labor, aided by use of electrical energy; introduction of assembly lines



1870

ELECTRICITY

THIRD

INDUSTRIAL REVOLUTION

Use of information technology and electronics for further automation of manufacturing



1970

INFORMATION TECHNOLOGY;
DIGITAL PROCESSES

FOURTH

INDUSTRIAL REVOLUTION

Cyber-physical systems connect real objects with virtual processes; networked manufacturing



2020

ARTIFICIAL INTELLIGENCE (AI)

DREES & SOMMER

1

Of the four industrial revolutions, the fourth – the AI revolution – could have the most far-reaching consequences.

2030 – A Day Living with Artificial Intelligence

Simon lives in a smart building for singles just outside the city. His digital assistant, **Sophia**², wakes him up at 7:30 hours with his favorite morning music from his personal playlist. Still a little sleepy, he asks for a cup of coffee and a slice of toast with jam and butter. Sophia automatically switches on the coffee maker and sets the automatic toast making machine to work.

By the time he has had a shower, Simon's breakfast is ready, and he only has to take butter and jam out of the refrigerator. The fridge registers how much is used and adds any items that are getting low to his order list. While having his breakfast, Simon picks up his smartphone and orders a robot car, which will autonomously drive him from his condo to the nearest stop on the metro rail line, which is also driverless.

During the journey, he relaxes and looks out of the window. In the fields along the way he sees **driverless agricultural vehicles**³ auto-nomously sowing field crops and applying the minimum amount of fertilizer required for the particular soil.

When he arrives at the train stop, a seat has already been reserved for him on the next metro train by his smartphone, and payment has been arranged via a mobile subscription. He soon goes past a futuristic structure, a data center with a large glass-paneled building dedicated to urban gardening, where fresh fruit and vegetables for the city are flourishing.

At his stop in the city center, Simon transfers to an **autonomous minibus**⁴, which continuously circulates the district where his office is situated.



5

Digital assistant R4D4



6

Medical robot © imago images / Xinhua

He reaches his office after a short walk, is admitted by a face recognition system and is offered an overview of the free workstations to choose from. Once he has settled himself near a window, he is greeted by his **digital assistant R4D4**⁵, with which he communicates through speech recognition. Documents for Simon appear on a large screen. First, R4D4 shows him incoming emails and appointment requests, sorted according to his personal priority settings, and completed tasks that the digital assistant needs Simon to approve.

Finally, R4D4 suggests a schedule for the day and arranges video conferences via the central server. It also shows Simon the time slots available for conceptual work, in which it provides Simon with the necessary documents and analyses data. Half an hour before the end of the regular working hours, R4D4 reminds him of any tasks that cannot be postponed.

After he has finished all his work, Simon begins to feel slightly under the weather, and fears he may be developing a cold. Using his smartphone, he requests an appointment on short notice at one of the medical stations distributed throughout the district. When he arrives, a **medical robot**⁶ gives him a brief but thorough health check.

The robot takes his temperature, gives him an eye test and takes a small sample of blood, which it analyzes immediately. It then gives

him a diagnosis: Simon does indeed have a slight cold. Medicine precisely tailored to his constitution is produced in an instant, and he is able to take it home with him.

Simon has now had enough of digital service for the time being, and he goes to the Italian restaurant around the corner – a hidden gem where the dishes are still hand-written on a large blackboard. He enjoys the tech-free atmosphere. Then, contented and full, he sets off for home, taking the same route as in the morning, in reverse order. The front door is opened for him with the help of facial recognition; Sophia greets him joyfully and asks what he would like for dinner. When he tells her he has already eaten, she seems slightly standoffish, and he cannot help thinking that all his AI devices give the impression of being slightly offended.

At the end of the day he takes a bottle of red wine out of the digitally temperature-controlled wine cabinet and Sophia automatically puts on one of his favorite programs on the home theater system. When he begins to feel tired and yawns, Sophia advises him to go to bed. She lowers the temperature in the apartment and selects the ideal level of air humidity for the night. Simon has a quick shower, then falls into a deep, analog sleep.

Almost his whole day has been controlled and guided by artificial intelligence. O Brave New World!

3 Field robot Farmdroid FD20 –Autonomous sowing of sugar beet © Forschungsinstitut für biologischen Landbau (FiBL)



2

Digital assistant Sophia



4

Autonomous minibus © Bosch

How Does Artificial Intelligence Actually Work?

Artificial intelligence will become ubiquitous in the next ten years. In terms of its reach and its as yet incalculable potential, AI can be compared with the invention of the internet or the discovery of electricity. AI is a completely new form of digital intelligence. Artificial intelligence thinks completely differently from humans and therefore adds new aspects to our workflows and design processes that until now have remained invisible from us at the structural level. It improves our understanding of problems, and thus effectively our understanding of the world – because AI thinks, not emotionally, but purely logically.

Artificial Intelligence = Machine Learning

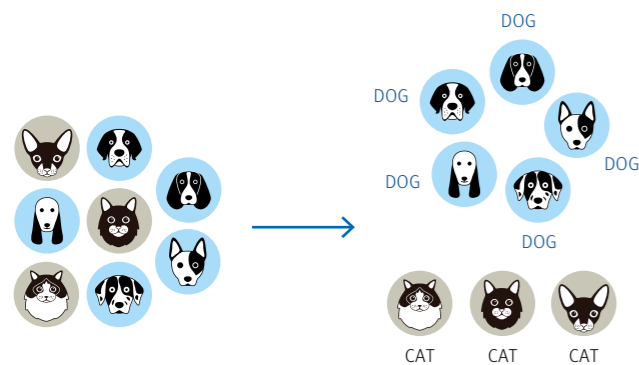
Instead of the general term artificial intelligence, experts prefer to speak of machine learning. In a traditional algorithm, programmers or analysts establish a specific logic, which does not change over time. In **machine learning**, on the other hand, the logic can adapt over time – the machines 'learn' and artificial intelligence develops. This means that the machine automatically develops further and improves. There are essentially two approaches:

› **Supervised machine learning**⁷: In this learning process, there is training data in which the input parameters and the result are known. What looks like a dog, is a dog. And what looks like a cat, is a cat.

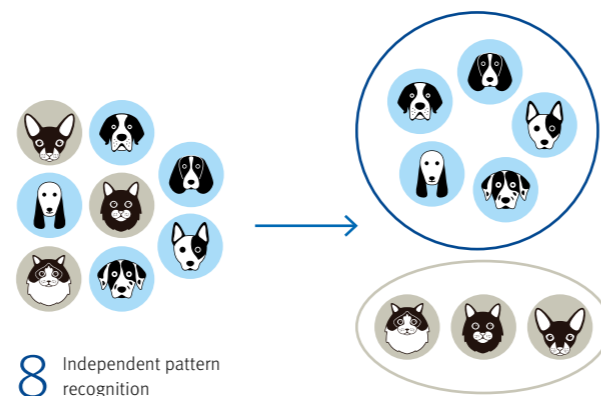
So, the machine uses known data in order to recognize patterns and connections. In the training process, the algorithm learns the patterns using sample data. The training data gives rise to models, which, together with the machine learning, deliver the result to algorithms. Once the models are created, we can feed the system with unknown data and it works out the result for us.

› **Unsupervised machine learning**⁸: In unsupervised learning, the system does not know what it is supposed to find. It recognizes patterns and divides the data into clusters or categories, but without knowing what the categories are, or which label they fall under.

In unsupervised learning, when an artificial intelligence system processes images of, for instance, animals, the system separates everything that looks like a cat and everything that looks like a dog into the appropriate groups, but without labelling them as such, because (of course) what is a cat and what is a dog has not been defined. This method is used when we do not yet know the data and so cannot give any instructions. These algorithms attempt to point out interesting, hidden patterns in the data, as in clustering, for instance.



7 Pattern recognition by means of sample data



8 Independent pattern recognition

› **Reinforcement learning**: In this particular form of machine learning, the algorithms interact with the environment and are assessed using a reward/punishment system. This system ensures a continuous learning process, as the algorithm is rewarded for good decisions and punished for bad ones. Reinforcement learning is what, for instance, autonomous driving and robotics are based on.

Deep Learning

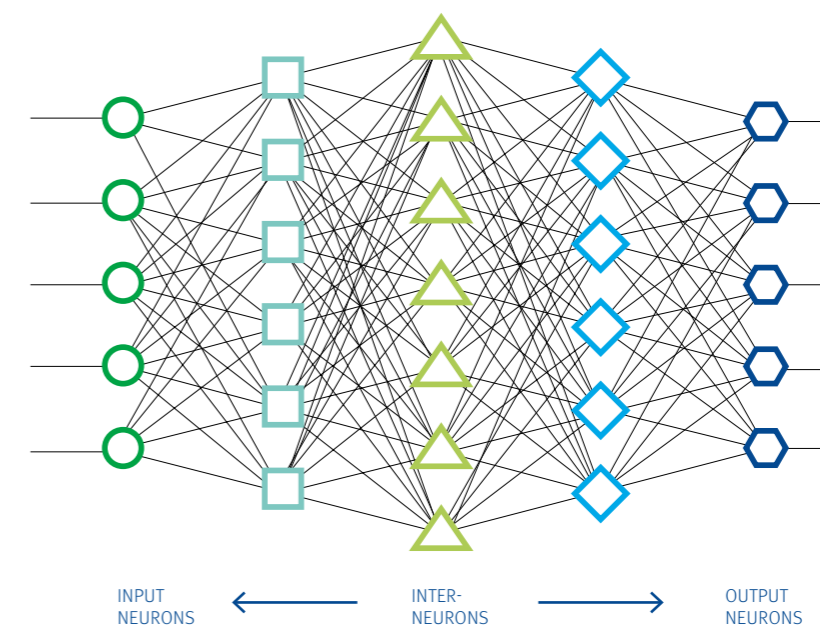
Deep learning is a subset of machine learning, and can be seen as the autonomous learning area of artificial intelligence. Our brain has a network of around 85 billion nerve cells, or neurons, and tens of thousands of these neurons are in constant communication with each other. They form the basis for human learning processes.

The basic concept for creating artificial intelligence is the replication of the human brain by the principle of multi-layered or deep learning, with the aid of an artificial **neural network**⁹.

This neural network has a layer of input neurons and a layer of output neurons. Between these are up to 150 layers (hence the term deep) of interneurons. The input neurons can be linked with the output neurons along different paths via the interneurons.

The more neurons and layers there are (up to 250), the more complex the data that can be mapped by extracting patterns from existing data and information and classifying them.

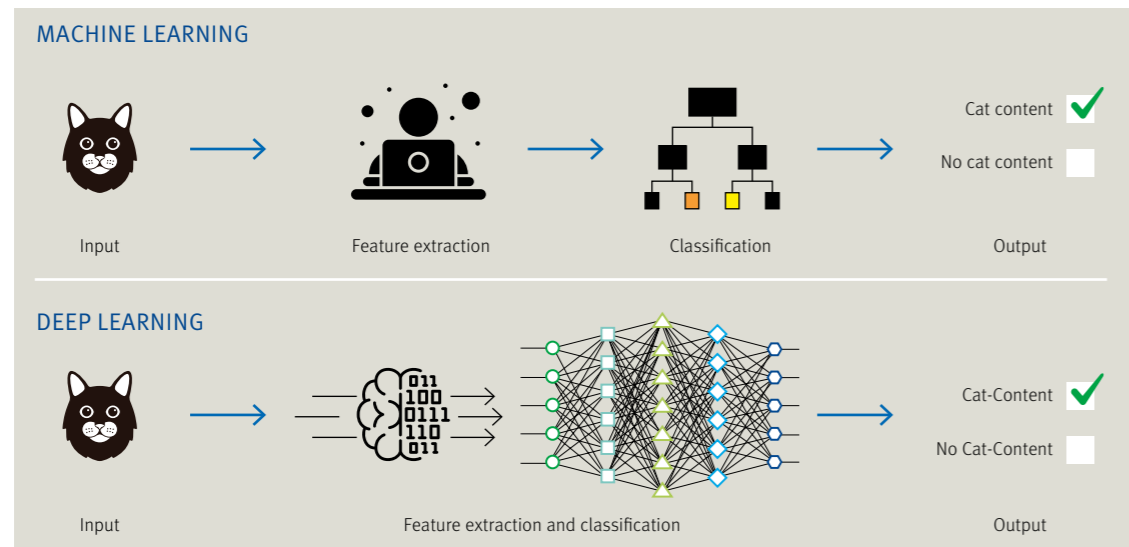
The machine is therefore able to learn without human assistance. In contrast to normal machine learning, in deep learning humans do not take any part in the analysis of the data and the actual decision-making process. They only ensure that the information for learning is provided and that the processes are documented. Deep learning is well suited to any situation in which large quantities of data can be scanned for patterns and models – for instance in facial, object or speech recognition.



9 Neural network

10

The difference between machine learning and deep learning



For the relevant decision-making processes, AI uses the same process as evolution. It goes through an almost infinite number of possibilities, filtering out the weaker results to finally find the optimum solution.

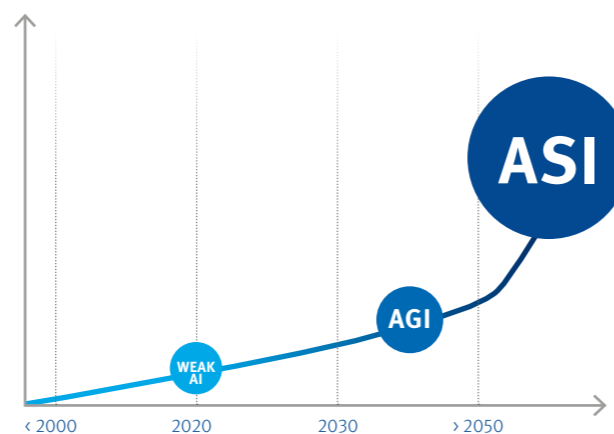
The diagram above explains the difference between normal machine learning and deep learning. In machine learning, humans have to extract the relevant features manually. Using these extracted features, the software then constructs a model.

By contrast, a deep learning workflow extracts the features required automatically and without any human assistance. The results of deep learning networks improve as the quantity of data increases. It is to be assumed that future quantum computers will be able to handle the increasing size and complexity of the data sets increasingly fast.

The Future of Artificial Intelligence?

Artificial intelligence is unlikely to become an irresistible phenomenon that will dominate the whole world within the next ten years, but it is equally unlikely to develop into an only slightly improved version of Alexa. Instead, it will have a wide variety of different applications in the areas of natural language, image recognition, machine cognition and learning. These applications could be quite creative, and as early as 2030 they could be networked with each other in such a way that this artificial intelligence will be capable of human communication with a personality, cultural background and perhaps even humor. It will also replace touch screens and laptops, apart from a few applications.

In general, artificial intelligence is divided into **three phases**¹¹:



11 The three phases of artificial intelligence. Source: UBS, as of 15 August 2016



The majority of German senior managers fear that the introduction of artificial intelligence could have a negative impact on their corporate culture.

First phase: weak artificial intelligence (weak AI), also artificial narrow intelligence (narrow AI)

The status of AI development currently reached in 2020 basically corresponds to weak artificial intelligence (weak AI, also known as narrow AI). This is different from standard software in that it is already proficient at machine learning and has now mastered some initial stages of deep learning. Each AI system, however, is specialized for precisely defined tasks. Some examples of these are Google's AlphaGo; applications for autonomous driving; chatbots; IBM's Watson; and the universal German translation program DeepL. All of these applications are therefore only 'intelligent' in a specific area; weak AI systems cannot yet transfer their knowledge to other intelligences. However, even this initial level of AI can allow existing software and technology applications to be revolutionized.

Second phase: artificial general intelligence (AGI)

Artificial general intelligence (AGI) is able to transfer individual developments to other intelligences. In its final stage it should theoretically be roughly comparable to human intelligence. To reach this stage, however, it would first of all have to gather experience itself in the same way as humans, and the development has a long way to go before this is possible. It is based on unsupervised deep learning. Estimates as to when this stage will be reached range from decades to centuries. In any case, there are considerable hurdles to be overcome first.

Third phase: artificial super intelligence (ASI)

In the view of many experts, we will be able to develop artificial super intelligence (ASI) relatively soon after the end of the second stage. Some people forecast a veritable intelligence explosion, after which AI will surpass human intelligence in almost all areas. This naturally raises the question of who should then have the last word: science, or a (democratically elected) government? Or perhaps the market, or consumers?

One of the most important future issues will therefore be the problem of AI as a black box. This problem increases as the programs become more complex. If the responsibility for decisions is to remain with humans, they must be able to understand the mechanisms for, and rationale behind, decisions made by artificial intelligence. Initial attempts are being made to solve the black box problem. However, in the meantime probably the most promising approach is to work out the AI system's processes by means of an audit of the training data.

The whole world clearly needs conclusive answers to these and other questions, and quickly. In all probability, we will cross this threshold of AI development. And if we do not find a solution to the black box issue, artificial superintelligence may be humankind's last invention.

Impact of AI on the Environment and in the Construction and Real Estate Sector

Our industry is naturally particularly interested in all areas in which we will come into close contact with artificial intelligence. These could be issues of general relevance, or very specific applications.

AI and the Environment

The area of mobility will undergo huge change. Intelligent algorithms, for instance in the form of artificial neuron networks, can analyze traffic and develop more efficient traffic management systems. Rail vehicles of all kinds, buses and other transport methods, will operate autonomously by means of artificial intelligence. AI will also create integrated timetables, control traffic lights and railroad crossings, and organize any necessary repairs and maintenance. This in turn will have an impact on urban planning and the development of infrastructure and transport routes, especially in the area of control systems and public utilities. All these measures will result in less uncontrolled private transport, considerable energy savings, and a reduction in pollution.

AI can also help to noticeably reduce the strain on the environment by ensuring an intelligently analyzed and optimized mix of central and decentralized energy supply in conjunction with renewable energies.

The raw materials problem is almost more critical than that of energy supply. The construction industry is the biggest user of raw materials,

accounting for 50 percent of the total consumption – and this certainly should not be the case. First, the sector must put more thought into the design of buildings and, second, it must develop harmless and reusable structural elements. Artificial intelligence could make a breakthrough to a green and circular economy (Cradle to Cradle – C2C) in the construction industry in this way, by linking materials databases with structural elements on online platforms and issuing licenses through an automated system.

AI can also support the reduction of pollutants at the global level. For instance, earth observation satellites working with AI can already provide detailed information about processes on the earth's surface and in its atmosphere using pattern recognition and by making connections between large quantities of data.

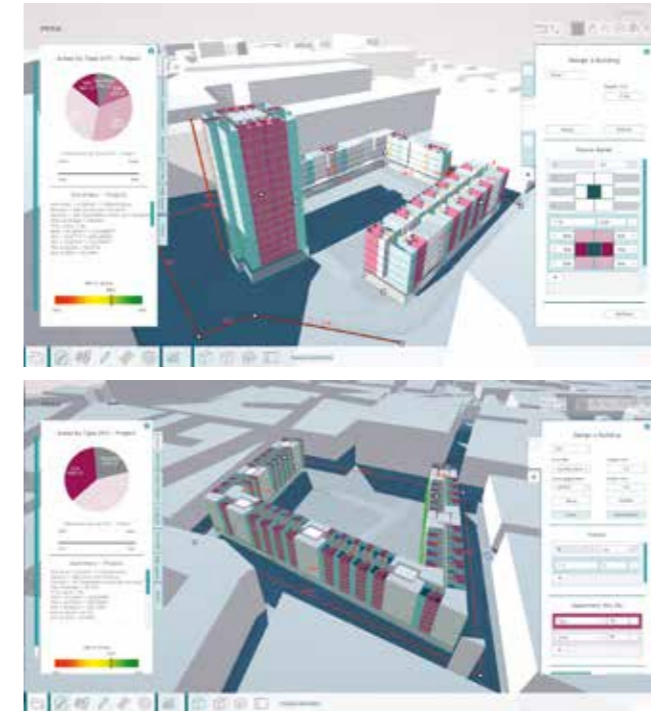
We will be able to break down this information using artificial intelligence in the future, and so find the polluters and hold them to account.

Much positive action has thus been taken to protect the environment, but unfortunately there is another side to the coin; the energy used by AI applications such as deep learning, simulations and forecasts will be colossal. Some forecasts suggest that data centers will account for up to eight percent of global electricity consumption in 2030.



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Satellite Sentinel-5P
© ESA/ATG medialab



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Automated urban planning with APP PRISM
© Bryden Wood

AI and Urban Planning

In urban planning, there will be a trend away from individual solutions toward intelligent interaction, with the intention of networking buildings, districts and entire cities. In the not too distant future, by collecting and analyzing data using selected digitization modules, AI systems will be able to precisely analyze and optimize entire districts, cities and towns – as well as real estate portfolios – and make decisions. This applies to city mobility management as well as intelligent electricity supply and storage, utility provision, waste disposal, and building conditioning.

AI can access geodata, that is to say, all the data on the operation of a building as well as on its users and the environment. It compares, for instance, the occupancies, capacity utilization, and uses of space in different buildings. It includes energy needs as well as the requirements for utilities and waste disposal and mobility, and is thus able to make suggestions for optimized urban modules with forward-looking developments.

PRISM¹³, an open-source web application developed by architects Bryden Wood for the Mayor of London, shows the extent to which AI has been accepted in the reality of this urban planning. The app combines London's spatial planning rules with building regulations, and is based on an intensive analysis of data (machine learning) from recently completed residential construction projects in London. On the basis of this data pool, the app automatically generates plans for specific uses of vacant sites with optimized ground plans. It integrates geodata sets such as land classification, locations of trees, traffic restrictions, and listed buildings of historical interest situated nearby.

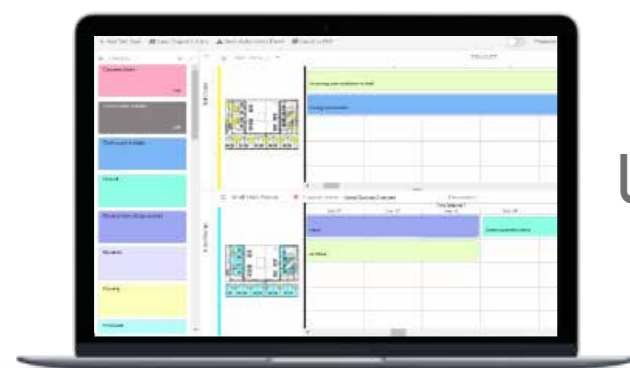
The AI system helps the city council to plan, uses all available information and learns from completed projects in order to create an optimal ground plan for the building plot concerned and make the best design decision. Prism is a good example of how an app based on AI and data analysis is already able to actively help users. Drees & Sommer is already collaborating on a version for other countries and municipalities.

AI and Construction Planning

In construction planning, AI is most likely to have a role to play in the short and medium term where optimization of processes and cooperation are required. The challenge is to ensure that stakeholders' different BIM models do not clash. AI is used in the form of generative design in order to identify and eliminate conflicts in the design phase, or to perform design tasks independently. The first steps have already been taken, especially in the area of mechanical, electrical and plumbing (MEP) engineering. Using existing calculation methods and data in addition to expertise from many completed projects, AI learns through machine learning, for instance, to generate sewerage system calculations for ventilation or for a sprinkler system in different variants. AI will then be able to set up these planning tasks independently for further projects in the future. The increasing modularization of buildings will reinforce and accelerate this process even further. The analysis of completed projects by AI will enable the automation and optimization of a large number of design processes, as the design knowledge is not lost repeatedly when individuals leave their jobs, but stored permanently and expanded continuously.

Artificial intelligence also opens up possibilities in BIM for analyzing the required cost estimate and scheduling data from every possible source and integrating it into the phases of the project. For instance, LCM Digital® is a cloud-based software solution with a mobile app to improve communication and cooperation between construction project teams, resulting in higher quality and helping to avoid defects, reduce costs, and ensure the project runs smoothly.

All project stakeholders are included and, thanks to intelligent reporting, they receive all the project status information necessary to show them what progress has been made on the project, in addition to any deviations from the plan along with solution approaches. In the latest development stage, LCM Digital® will use the power of artificial intelligence and deep learning to improve the processes in line with the relevant specifications in self-learning systems. Priority can be given to construction speed, economy or another factor.



LCM
DIGITAL

14 Cloud-based software LCM Digital® improves collaboration between construction project teams



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Are AI controlled robots the future workforce?
© FBR Ltd.



Scan and watch video

16

Robot interior construction
© National Institute of Advanced Industrial Science and Technology (AIST)



Scan and watch video



AI and Construction

In industrialized construction, AI will revolutionize both manufacturing and logistics. Intelligent robots will be used for manufacturing in assembly halls and on the construction site, where they will also perform repetitive and heavy work.

Industrialized construction has two basic variants:

First variant

The load-bearing structure, including the mechanical, electrical and plumbing (MEP) systems and finish, is entirely prefabricated. The only task performed on the construction site is the assembly of the completed components. The load-bearing structure is mainly made of wood composite material. Assembly times on the construction site are very short, while a longer time is needed for prefabrication in the factory. This method is mainly used for standard buildings with specified possible variations.

Second variant

This variant concentrates on load-bearing structures consisting of a shell of steel, wood or concrete using state-of-the-art formwork systems, prefabricated components, bricklaying robots etc. It is based on extensive and coordinated prefabrication of MEP systems and finish elements in a modular construction technique. This results in a longer construction site phase, which however takes place in parallel with the shell construction. With perfect planning and logistics, the project does not take much longer. The focus here is on buildings with more individual layouts.

What is crucial to the success of either procedure is detailed coordination of the content and timings of the design and prefabrication, logistics (supply chain management) and assembly planning. Everything must be well synchronized, and LCM Digital® is ideally suited for this purpose. For optimum efficiency, the project stakeholders simulate many possible scenarios with AI in the form of machine learning, with the objective being either to complete the project as economically as possible or to make the construction time as short as possible – or, of course, a combination of both these goals.

Much of the prefabrication of the structural elements is still done by hand at present. That will change sooner or later. In the automobile industry, it is already common for cars to be built by robots. In the future, they will also be able to produce structural elements and modules of all kinds and every level of complexity. However, as the end products – the buildings – are more or less unique, the use of artificial intelligence will be very important here too. Such a large quantity of data will be generated – and will need to be combined into ever newer processes – that machine learning or even deep learning will also have to be used for this.

Furthermore, it is to be assumed that in the coming years robots, which have also learned their ‘craft’ through machine learning, will increasingly also carry out the assembly on the construction site. They are not tied to any working times; nor do they take holidays or, in an ideal scenario, any ‘sick leave’, thanks to scheduled maintenance during periods of downtime.

//////
Only AI
can make
buildings
and cities
really
sustainable.

AI for Building Operations

The buildings of the future will operate themselves. Some pioneering examples of these are customized smart buildings such as The Ship in Cologne, Hammerbrooklyn.Digital Campus in Hamburg, and cube berlin at the heart of Germany’s capital city.

These buildings all place users and their needs first, and they take their inspiration from human beings. The sensors are the equivalent of the sensory organs, and an artificial intelligence system represents the ‘brain’. The AI system learns from data on building operation, the user and the environment, makes suggestions as to how the building should be operated in the future, and optimizes it constantly.

A central network structure – the ‘brain’ – links the entirety of building automation systems with all the technologies used.

In practice, this means that, if workstations or rooms are not permanently allocated, when a user enters the building an app shows the vacancies. The building identifies the requirements of its users with regard to comfort and individual workstation requirements. If there is no one in a room, the system regulates the indoor climate accordingly to reduce the carbon footprint. A well designed tracking system, in compliance with data protection regulations, makes space utilization and movement in the building transparent. This improves work processes and makes them more efficient. For instance, cleaning staff do not even need to enter unused offices.

These digital processes require smart advance planning, and a clear idea of what is actually meant by ‘smart’: a city that merely gathers data on inhabitants and guests? Or a really ‘intelligent city’, which uses the information gathered to create synergies and added value for society? It depends on the right use and networking of this information. Without AI, there will be no sustainable blue city.

AI in Real Estate Transactions

German online portals such as Immobilienscout24 and Immowelt have made a name for themselves by making clever use of the early versions of artificial intelligence. Other market participants are also already offering solutions around big data by linking and networking a whole variety of real estate data, locations and users. To do this, they enable the analysis of relevant AI records from many different sources, such as land registry offices and building authorities, real estate management companies, owners, financiers, etc.

For transactions, there are virtual data rooms such as Architrave or Drooms. Analysis of specific documents is also available as part of a partially automated legal due diligence process (for example Levertor). Much of the data that previously had to be extracted painstakingly and at great cost from a large amount of often similar documents can now be processed automatically, thanks to artificial intelligence.

The impact of property technology – or proptech – on real estate transactions is still limited at present, primarily owing to the strict requirements with regard to procedures. Information can be processed, but the transaction itself still needs to follow the same sequence as in the pre-digital age. However, this could change, especially with the aid of blockchain technology, which will use digital signatures to meet the procedural requirements. For this reason, Drees & Sommer and InterfaceMA together developed a data aggregator, which combines all the real estate-related data from several sources on a user-friendly hub: the Mosaix platform is an AI application which scans data pools for specific content and delivers the requested details. It enables users to obtain georeferenced information at a glance on, for example, a certain address over its entire life cycle, without having to actually visit the address.

However, Mosaix users can also use the platform to search all internal data pools, for instance to analyze comparative data and define benchmarks, or to automate processes, reports and analyses. Ultimately, this AI application also helps users to make informed, data-driven decisions.



Working and Business World

Owing to the progress in digital transformation, tasks that are repetitive and predictable have increasingly been performed by computers or robots over the past few decades. The plus side of digital processes and automation technology is that they have reduced costs, increased productivity, improved the customized fulfilment of demand and enabled staff capacity savings. The use of artificial intelligence will accelerate these developments further, as computers and machines operating on the basis of AI will perform ever more complex tasks.

We must realize that, on the basis of our current economic system (with its focus on, for instance, competition, efficiency and productivity, expansion, increase and acceleration through innovation, etc.), the following steps are imminent:

- › Anything that can be automated, will be automated.
- › Anything that can be transformed in digital data and automated processes, will be transformed and automated.
- › Anything that can be changed by artificial intelligence, will change.

For the construction and real estate industry – as for other sectors – there is, in principle, already a key question to be addressed: What can AI, algorithms and machines do better, more economically or more flexibly than a human being?

Organizational Structures and Processes

In the same way that intelligent robots are carrying out more and more work in manufacturing, voice-controlled assistants will be imminently replacing keyboards and touchscreens in offices.

Individual employees, but also companies as a whole, will increasingly have personal digital agents which will perform a wide range of tasks, particularly related to daily communication, information processing and organizational matters. These programs will also communicate with each other autonomously on behalf of the parties they represent. However, as mentioned, humans will retain the decision-making authority, at least in theory.

In ten years artificial intelligence will most certainly be a crucial feature of companies of all sizes. AI will spread into all areas of work and every sector in different ways, changing almost all professions to varying degrees. However, this does not necessarily mean that some professions will no longer exist, or that AI will make employees redundant. Some areas of activity will be highly automated and largely restructured, but on the other hand many new fields will emerge. In order to anticipate future changes, companies have to convert all internal processes to AI-driven processes. This means that in the next few years firms will have to adjust all their production, working and decision-making processes to allow for collaboration between staff and a new form of intelligence.

For companies themselves, this challenge means not only being forced to deal with new and fundamentally different circumstances, but also having to ask themselves how they can successfully manage the transition of their own organization. This requires a clear value system, a certain level of managerial willingness to take risks, and a positive attitude toward change. It is also important not to take action just for the sake of it and implement AI applications unthinkingly. Instead, companies must apply AI for the first time in precisely those areas where it can already generate value added.

AI and Client Relationships

Owing to the improvement in production capabilities, it will become increasingly important in the future to pay close attention to what clients really want or need, and how their requirements change. Artificial intelligence and big data will play an extremely important role in this area if they help companies to understand, through larger quantities of available and actually used data, why, how and in what specific context consumers use the relevant product or service.

Companies will thus not so much be marketing what they produce or offer. Instead, they will be able to produce or offer what clients actually want or need. This means that artificial intelligence can help the clients themselves to determine which other products or services will enhance their lives.



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Are AI controlled robots the future workforce?

Work and Ethical Questions

In the future, the question will be not so much whether there is still work for everyone, as whether there will be enough staff to oversee and manage the change in a dedicated way. The work itself will remain unchanged – it will probably even increase – but the distribution between human workers and artificial intelligence will change dramatically.

This raises the ethical question of who will be in charge. If you believe the positive assessments, humans will be the future managers of artificial intelligence systems, and will assign them work. However, there are also rather negative appraisals according to which AI will monitor the work and performance of employees. In an extreme scenario, AI could measure human performance, increase efficiency and be responsible for promotions, disciplinary warnings, or even dismissals. Incidentally, conditions similar to this already exist in the warehouses of large mail order companies.

The direction taken will thus depend very closely on the corporate culture.

The Future of HR

Considerably greater demands will be placed on human resources departments in the future than today. Of course, the main aspect of their work will continue to be finding competent staff and retaining them long term if possible. However, helping management to identify the appropriate artificial intelligence system and integrating it into the company will become equally important. This means that HR and chief information officers will together be responsible for a whole new area – the company's digital resources.

However, AI will also have a significant impact on the processes within human resources.

This applies to the recruitment process in particular, as the integration of AI will make processes more effective and contribute to the retention of better, more highly trained staff. It will select suitable candidates automatically (by a method similar to that of an online dating agency, contact them promptly and arrange first interviews).

However, the greatest challenge will be the transformation of the staff into mixed human-robot teams. This means helping staff to work with their digital partners – the AI systems – without fear.

One of the keys to the success of human resources departments in the future will be its ability to develop a symbiotic relationship between its human employees and artificial intelligence, customized to the company in question and its business models. This symbiotic relationship can be calibrated to requirements. However, it appears rather inconceivable that conflicts would arise.

Conclusions

Artificial intelligence is set to permeate management, our daily work routines and our private lives more profoundly and more quickly than most people imagine today.

On the other hand, in a survey two-thirds of senior managers stated that they were very well aware of the importance and potential benefits of artificial intelligence. However, only a relatively small minority knew what AI involves in practice, and the ways in which it can already be used. Also, many companies have as yet made little or no effort to use AI.

This leads us to the conclusion that many corporate strategies are not yet making any allowance for the application of AI. However, such a strategy is necessary if companies are to be able to use AI successfully. To identify AI-compatible problems or tasks, humans have to learn to understand all aspects of artificial intelligence. It is only by understanding AI and its possible applications in different areas that we will be able to launch successful pilot projects. The possibilities of AI should not be overestimated, but nor should its potential be underrated. In order to identify where AI can create the most added value, AI experts have to be systematically teamed up with internal staff who are specialists in their own areas.

A big obstacle to the introduction of AI is presented by legacy systems. Legacy systems such as outdated IT infrastructure and software are the easiest to tackle, but decision-making and assessment systems can also be legacy systems. However, the biggest problem is posed by habitual personal routines and working procedures, as artificial intelligence fundamentally challenges habits, traditions and evolved structures.

The basis for successful transformation is certainly the establishment of an AI training and education program, which can do a lot to dispel people's inhibitions around engaging with AI. Decision-makers within the company have to explain to all staff the potential of the new technology, helping them overcome their fear of working with AI. Also, continuous, intensive training of existing staff initially has to be given priority over the recruitment of new talent.

Experience has shown that there will be enough work for everyone. However, it will be allocated differently than at present. Everyone has to be prepared for this. Companies and third-level institutions must seek to collaborate on this and ensure that employees are given ongoing training over their entire working lives.

Policymakers certainly also have to start thinking carefully about how AI will change the social structure. This applies to the education system as a whole, as well as the tax and social insurance contribution system and the entire infrastructure. What is important is to WORK TOGETHER:



Humans have to see themselves and machines as fellow team members in this transformation process.





INTELLIGENCE SQUARED

Client: CA Immo Deutschland GmbH, Frankfurt | **Project duration:** January 2016 – mid-2020 (anticipated) | **Architect:** 3XN, Copenhagen | **Drees & Sommer services:** Digitization consulting, general technical planning, building services engineering, energy design, building physics, building ecology, facade engineering, Green Building certification | **Key project data:** GFA: 24,500 m², investment costs: Approx. €100 million

With the support of Drees & Sommer, cube berlin – an office building as smart as it is spectacular – was completed in a construction period of just over three years.

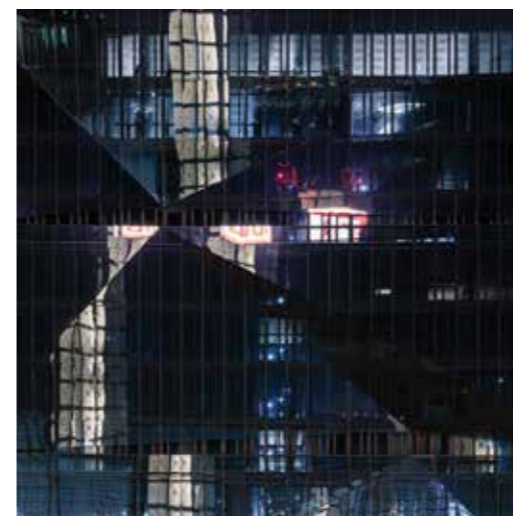
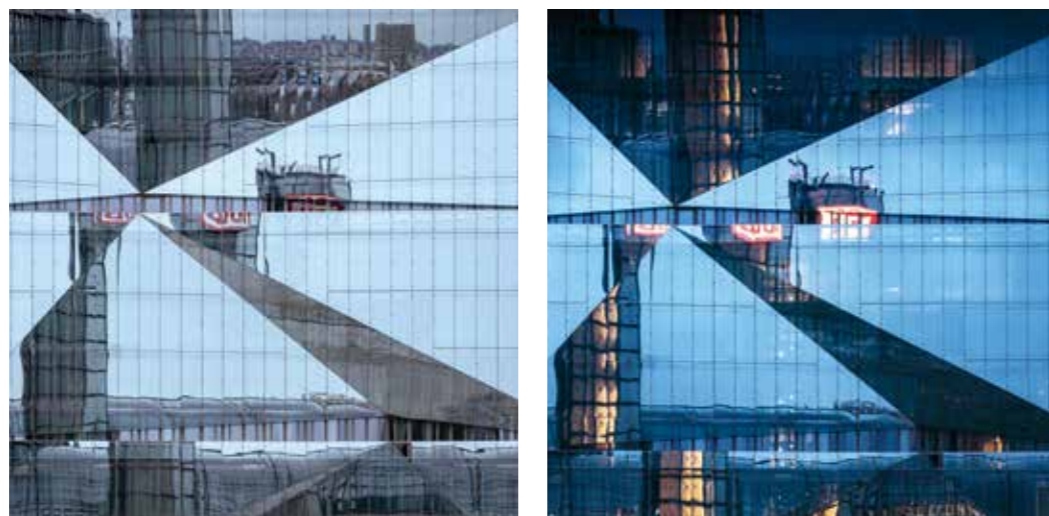
Built by CA Immo, cube berlin is in a prime location on Washington Platz, a square next to Berlin Central Station. Designed by 3XN Architects, the cube-shaped building is a unique combination of technology, architecture and sustainability.

The high demands for the building posed numerous challenges for all project participants from day one. For example, the all-glass facade had to meet stringent energy efficiency standards, despite the fact that only limited space was available for building services equipment, as an impressive roof terrace was planned for the roof.

Drees & Sommer experts took up the challenge: Originally commissioned with the energy and technology concept, the experts impressed the client so much with their concept that their remit was expanded to include general technical planning for the building, and other services.

Located on Washington Platz next to Berlin Central Station, the cube berlin's unusual glass facade impresses locals and visitors alike.

Artificial intelligence inside,
artistic vision outside:
The glass facade creates
attractive plays of light at
different times of day.



Its central 'brain' makes
the cube berlin a flagship
digitization project.



“cube berlin is an impressive combination
of technology, architecture and sustainability.”

Philipp Keydel,
Project team leader at
Drees & Sommer

The innovative technology concept significantly increased the leasable area. And the use of solar cooling with DEC (Desiccative and Evaporative Cooling) technology in combination with intelligent energy transfer enables energy consumption to be reduced by approximately 50 percent compared to conventional ventilation and air conditioning.

A holistic digitization strategy was developed and implemented in collaboration with the client, making cube berlin a flagship project that lays claim to being the smartest building in Europe. All digital components are networked in a central system called the 'brain' that meets the highest IT security standards, allowing the building to be operated and used much more efficiently. For example, it learns from operational, user and environmental data, and automatically switches off heating, cooling, ventilation and lighting in areas that are not currently in use. The digitization concept focuses entirely on providing added value for users and optimized operation: Tenants can use a specially developed app to control the indoor environment, access control, lighting, blinds, and many other features. The asset, property and facility management systems use the data generated to ensure efficient and economical operation – in full compliance with data protection regulations and GDPR.

Two years before the completion of the building, CA Immo had already begun to map the interaction of hardware and software components in the Smart Logistics Cluster in a test center on the campus of RWTH Aachen University and, with Drees & Sommer support, carried out extensive testing of data security, particularly with regard to external cyber attacks (penetration security).

Despite the modern, fully-glazed facade, the balanced mix of ecological, social and economic sustainability criteria also meant that the building was able to achieve Gold certification by the German Sustainable Building Council (DGNB). So it is no surprise that the cube berlin was fully leased before its completion.



“Thanks to artificial intelligence,
cube berlin will develop
into a self-thinking building.
It recognizes users' needs
and makes operation as simple
and efficient as possible.”

Klaus Dederichs,
Partner at Drees & Sommer



HELPING COLOGNE'S SCHOOLS MAKE THE GRADE

As the city of Cologne tackles its classroom shortage, Drees & Sommer is working with the client to develop standards that can be applied to all future school construction projects within its boundaries.

Client: City of Cologne Property Management, Planning & Construction Department |
Project duration: 2018 – 2023 | **Drees & Sommer services:** Feasibility studies, identification of basic requirements, functional requirements specifications, project management, BIM management |
Key project data: GFA: Multiple projects; largest new school approx. 17,500 m²

Students can look forward to a brand new school building in Zusestrasse.





“When combined with transparent design, multiproject management can lead to increased efficiency and greater productivity.”

The City of Cologne is investing some €520 million in a special program to speed up the construction of schools. The aim is to build urgently needed classrooms to accommodate more than 7,000 students. The package covers eleven school locations, seven of which are being handled by Drees & Sommer project managers under a sole contractor arrangement. A range of construction measures are being carried out at these sites, including new buildings, conversions, general repairs, extensions, and temporary buildings. A key requirement is the completion of the new buildings in time for the beginning of the 2022/23 school year.

The project team is tasked with developing uniform standards for all projects and standardizing the different user specifications to enable Drees & Sommer to support and advise the client on school building standards in the long term. This not only relates to architectural design, but also plant & equipment and operation by the facility management service provider.

The ultimate goal is the establishment of so-called ‘cluster schools’. These are not divided into classrooms, corridors, auditoriums and schoolyards, but arranged in clusters in which classrooms and other teaching facilities are combined with the associated recreation areas. As such cluster schools are not regulated by the building code, the project managers are coordinating closely with the building inspectorate and the fire department on topics such as fire prevention and emergency evacuation routes.

The team started the project in 2018 and submitted the first functional requirements specification in October the same year. The first sole contractor awards were made in July 2019. Construction of all new buildings is scheduled to begin in summer 2020, with the start of use in summer 2022. Drees & Sommer was also commissioned to draw up a functional requirements specification for fitout of a comprehensive school on the Severinswall road, the conversion of a former museum building to serve as a temporary school, and coordination of planning for that conversion project. The project team is also undertaking control of the virtual project using BIM management. The tender specification was developed in tandem with the functional requirements specification. All documents and models undergo regular quality assurance checks to allow the data to be transferred to the city’s BIM-compatible facility management system at the end of the project.

During this challenging multiproject, the project managers are coordinating the city’s various stakeholders and departments, while at the same time involving the individual schools and users in the project process and execution.

Anja Hallemeier,
Project Manager at
Drees & Sommer

A former museum is serving
as a temporary school building
until the completion of
the comprehensive school in
the Severinswall road.



A generous extension will be added to the Unter Linden school.



One of the buildings at the Palmstrasse school campus in Cologne’s city center has already been rebuilt.



The school in Siegburger Strasse will be rebuilt.



ALL NEW FACILITIES FOR WORLD SKI CHAMPIONSHIPS

Client: Markt Oberstdorf, represented by the Sportstätten Oberstdorf complex | Project duration: March 2018 – March 2021 |
Architects: Ski jumping arena: Renn Architekten, Oberstdorf / Cross-country skiing center: F64 Architekten, Kempten |
Drees & Sommer services: Project management, project control | Key project data: Project cost: Approx. €39 million



Restructuring work on the ski jump continues despite snow. The athletes' area is being rebuilt and the old ski jumps are being replaced with two smaller ones.

Extensive construction work is proceeding at full tilt to upgrade the ski jumping stadium and the cross-country skiing center in Oberstdorf. Drees & Sommer is supporting the principal with the coordination of costs, schedule, and more than 100 contractors.



“Our determination to participate in such a great project and bring it over the line is the key to our success.”

Oberstdorf in the Allgäu region of Bavaria is looking forward to the Nordic World Ski Championships 2021: All eyes will be then on Germany's southernmost municipality when thousands of winter sports fans cheer on the athletes in the upgraded facilities. A large part of the construction work had already been completed in time for the Vierschanzentournee (Four Hills Tournament) at the end of 2019. A trial run also took place on the World Championship courses at the Ried cross-country skiing center in January 2020, with athletes, visitors, operators and organizers putting the sports facilities through their paces. “More than 100 invitations to tender had to be issued and contracts awarded as quickly as possible so that the companies could start work on time,” says Christina Dohmann, Project Partner at Drees & Sommer. This gives an idea of the organizational challenge posed by the construction project. She and her team are responsible for ensuring that the project stays on schedule and within budget. Drees & Sommer has experience in managing construction projects for sports facilities and, in particular, for ski jumps. The project managers supported construction work for the last World Ski Championships in Oberstdorf in 2005.

Christina Dohmann,
Project team leader
at Drees & Sommer

The client, Markt Oberstdorf, has applied to the federal and state governments for funding: A total of €39 million will be spent on the Schattenberg ski jumping arena and the Ried cross-country skiing center. Drees & Sommer coordinated the project structure plan with funding authorities and planners, and prepared a detailed tender and award schedule for each stadium, involving more than 100 tenders. Possible funding scenarios were clarified and discussed in detail with all stakeholders in coordination sessions.

During the construction phases, daily coordination meetings were held with the project manager on unresolved issues and budget allowances. As there is no general planner for the project, the project managers were also responsible for consolidating costings submitted by the various planning offices for the individual subprojects. Restructuring, refurbishment and upgrade work was started in March 2019 after only one year's planning lead time. Snowmelt in spring and new snowfall the following winter left only a tight window for the major construction work.

Work for the ski jumping stadium was planned in 3D, and monitored using GPS during construction. The project team will continue to manage outstanding work on the stadiums until the anticipated completion in spring 2021, to ensure everything is ready in time for the Nordic World Ski Championships.



AUTOMAKERS ARE COUNT- ING ON THE FUTURE

Global, digital, climate neutral – and of course economically viable. Automakers face some serious challenges, both now and in the future.

The automotive industry is currently undergoing radical change like never before. Cars account for more than 60 percent of total road transport carbon emissions in Europe. The industry players are not only working flat out on alternative drives, but also on their own positioning – transitioning from simply being vehicle manufacturers to becoming mobility providers. And they are also focused on establishing themselves in new markets and strengthening their brand.

At first glance, BMW Brilliance Automotive in China, Mercedes-Benz plants in Salzburg, Hedelfingen, Sindelfingen and Kamen, Saxony, and the Meiller factory in Lower Austria appear to have little in common. But the one thing that connects them all – apart from the fact that they belong to the same industry – is that they are all counting on Drees & Sommer know-how for their extremely diverse construction projects to literally underpin their corporate strategies.

Worldwide, the automotive industry is counting on pioneering technologies. A network of industrial sites will need to provide seamless support for their respective corporate strategies.



A new BMW Brilliance Automotive car factory is taking shape in the Tiexi district of Shenyang in Northeast China.



“Our Automotive team is delighted to be working at top speed with our client towards the future.”

Dennis Schulz,
Senior Project Team Manager at
Drees & Sommer in Shanghai

BMW Brilliance Automotive (BBA) is building its new Lydia vehicle plant in the Tiexi district of Shenyang in Northeast China – in the immediate vicinity of the factory it opened there in 2012. A pressing plant, assembly and logistics buildings, a body shop, paint shop and offices with interconnecting infrastructure are all being built on the 3.2 square kilometer site.

A multinational Drees & Sommer team has been supporting the automaker on the ground in Munich and Shenyang since 2019. During the early planning phases, most of the project work was undertaken in Germany, whereas since the start of the detailed design stage the focus of work has shifted to China. Following site selection and master planning, the multiproject had to be divided into suitable subprojects. The Drees & Sommer team managed the tendering process for planning services, as well as design management. The planners followed the specifications of the BMW blueprint and integrated these into the design. The detailed design process in Shenyang focused on quality assurance.



Production at BMW Brilliance Automotive's new vehicle plant in Shenyang is slated to start in 2022.



“A new corporate headquarters strengthens a company's market and brand position – and can create synergies.”

Manfred Drescher, Andreas Matkovits and
Anna Lena Enzersdorfer, Drees & Sommer
project team in Austria

Nearly 8,000 km to the west, a completely different construction project has already been finished: The **Munich-based tipper specialist Meiller** completed construction of its new production facilities in Oed, Lower Austria on schedule before the end of 2019. The company's two production sites in Waidhofen an der Ybbs and Asten were getting on in years, and upgrade was no longer feasible. Meiller decided to invest in the future of its Austrian business and began planning a new production site. Completion by the end of 2019 was a key goal, not least because a grant depended on it. Planning had to be repeatedly scrutinized and adjusted to ensure that the project remained within budget. The Drees & Sommer team supported Meiller in an advisory capacity. As the project progressed, Meiller transferred more and more responsibility to the Drees & Sommer team. As a result, the experts undertook the tendering, contract award and settlement process, cost tracking, change management, as well as the process for the acceptance, handover and commissioning of building services equipment.

Tipper specialist Meiller is investing in its Austrian business with a new corporate headquarters in Oed.





The calm and modern colour scheme creates a pleasant working atmosphere.



The interior design is characterized by the use of high-quality materials.



The proximity to the Alps is reflected in the wall design in the meeting rooms.



“We value projects in which we accompany our customers throughout the entire journey – the cooperation is often intensive, the interaction trusting, and the result is gratifying for all parties involved.”

Nadja Pröwer,
Senior team leader and
Managing Director of
Drees & Sommer Austria
and Jasmina Brankovic,
Project team leader at
RBSGROUP – Part of
Drees & Sommer

A project in Eugendorf, just outside Salzburg, also involved a new Austrian headquarters. In April 2019, employees were able to move into their offices at the new **Austrian headquarters of Mercedes-Benz**. The company took the opportunity to rethink the cooperation between its teams scattered throughout Salzburg by drawing all the teams together at one location and making the design vocabulary of the building a clear expression of the brand.

The client was able to count on Drees & Sommer throughout the entire process. The experts supported the client with the site search, the lease agreement, requirements management, the office concept including furnishing and occupancy planning, as well as with relocation management. They controlled the schedule, cost and quality of the project on behalf of the tenant, and supported the client with technical & economic construction consulting. The team of experts was also a central point of contact for the project developer throughout the planning and execution phases. The client was so satisfied with the work of the Drees & Sommer team that the contract was expanded to include construction management for a training center, a project that has also been successfully completed.

A view into the courtyard of the new Austrian headquarters in Eugendorf.



Building 2 in Sindelfingen has been extended for the production of the new S-Class.



“The projects shown here demonstrate how strongly the various players are investing in the future of their company and the industry.”

Daimler is making significant investments in the future, including in its plants in Sindelfingen and Hedelfingen. In Sindelfingen, 2014/2015 saw the launch of the €2.1 billion complete renovation of its traditional factory site. As construction manager, Drees & Sommer is supporting the customer with an interdisciplinary team of experts in project management, infrastructure, engineering, construction management and process consulting. The project includes new buildings as well as the extension of established ones and various preliminary measures such as the construction of a data center, an office building, and a car park. As is typical with brownfield developments, making ideal use of the very limited space and the tight windows for delivery of large building elements presented a special challenge, because factory production had to continue without disruption despite the construction work. Another challenge was the planning and installation of supply lines and energy ducts in ground that was already densely packed with pipes and cables, not all of which were documented.

Conversions on a site with ongoing production are also an issue in Stuttgart-Untertürkheim. The automaker is transforming the plant into a high-tech site for electric mobility. For example, the **Hedelfingen plant is to become the assembly site for battery systems for Mercedes-Benz vehicles**. As project controller, Drees & Sommer is ensuring a smooth process and to allow battery assembly to go into operation on schedule.

Christoph Gawlik,
Head of Automotive at Drees & Sommer

Electromobility is also a focus of the project in Kamenz, Saxony.

A Drees & Sommer team supported the construction of the second part of the **battery factory of Mercedes-Benz**. The four-fold expansion of the site includes production areas for high-voltage batteries – as well as logistics areas, outdoor facilities, office areas, staff amenities, and an energy center with a waste management center.

During the project, Drees & Sommer was responsible for project management and focused on identifying optimization potential within the framework of the user requirements. Layout planning reduced investment costs. This is attributable to increased flexibility of the buildings, the reduction of the building footprint and outdoor facilities, and an increase in productivity as the result of installing ten instead of only eight production plants. In addition to project control throughout all phases of the project, Drees & Sommer managed construction management, developed the factory layout, coordinated DGNB site certification, and drew up the energy concept to ensure that the factory is carbon neutral. The project also included the supervising of the construction of a canteen on the site. The client achieved the important goals of on-schedule plant installation and production start, in large part thanks to Lean Management.

The bottom line: A dynamic industry that is powering ahead with investment in a sustainable future.

Batteries for electric vehicles are being built in the carbon-neutral factory in Kamenz, Saxony.



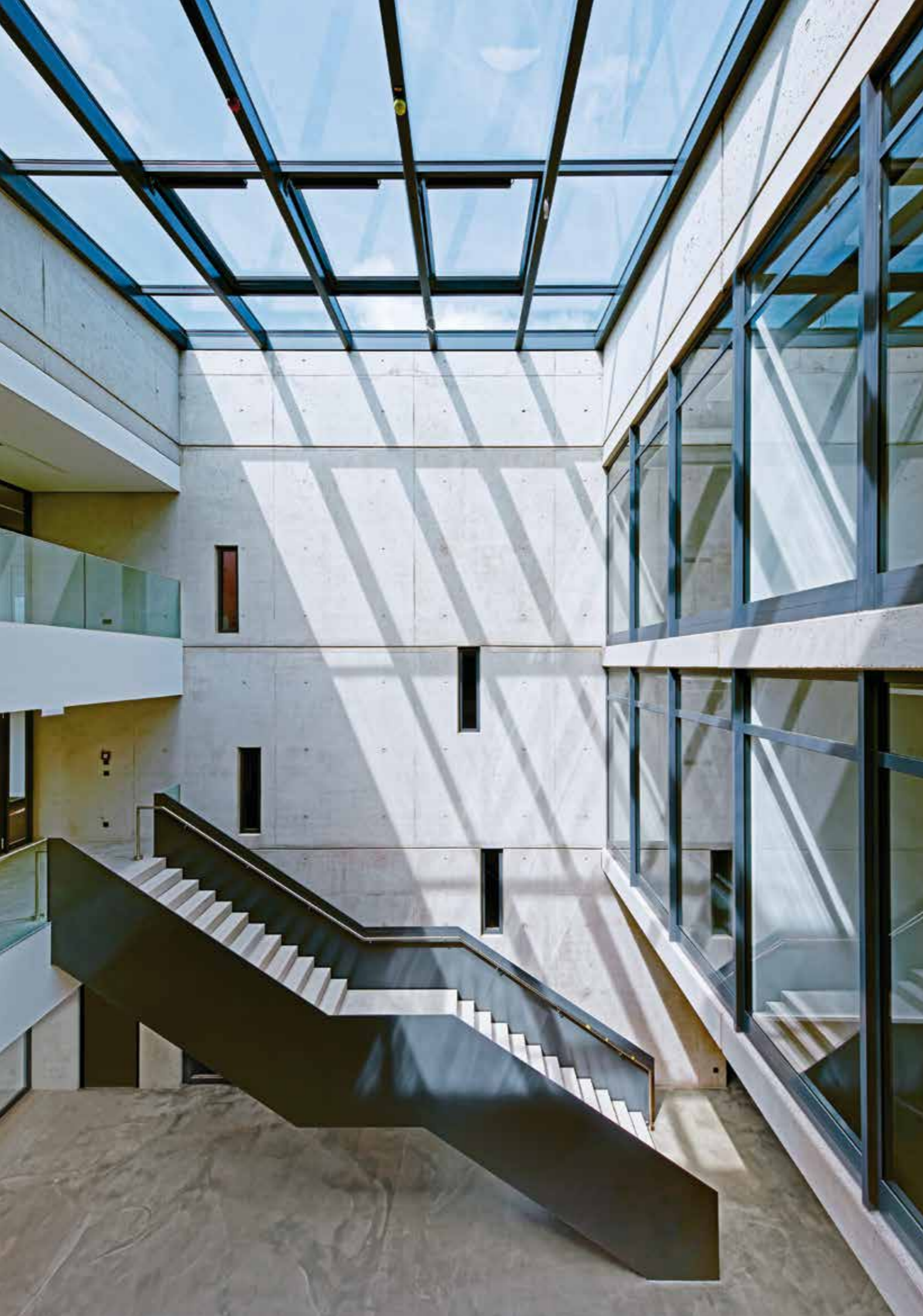
MODERN HEADQUARTERS AND COMMUNICATIONS HUB

At the end of last year, the Fürstenfeldbruck Department of Public Works moved into a new, stylishly designed building in the greater Munich region. Drees & Sommer provided comprehensive support to the principal and played a key role in ensuring that the project was completed on schedule and within budget.

Client: Stadtwerke Fürstenfeldbruck GmbH, Fürstenfeldbruck | **Project duration:** June 2011 – June 2019 | **Architects:** bbb Architects, Kiel | **Drees & Sommer services:** Project control, designer selection procedure, data management using the Project Communication System (PCS) | **Key project data:** GFA: 8,000 m², total cost: €17.8 million (net)



The vertical lines of the natural timber facade are visually reinforced by the EV charging columns promoting sustainable mobility.



Clear lines and visual axes provide orientation to visitors and employees.



“The project has allowed us to bring all employees together under one roof, demonstrating the client’s commitment to the future.”

Helen Sengler,
Senior project team leader
at Drees & Sommer

The new headquarters of the Fürstenfeldbruck Department of Public Works opened its doors at the end of 2019 following a construction period of two years. With separate elements for offices, workshop and warehouse, the building – which has an energy efficiency rating of KfW 55 – has allowed the consolidation of all employees under one roof.

Its timber facade and horizontal metal bands link the individual building elements both optically and functionally – and even met with the approval of the fire prevention expert. In addition to its energy efficiency rating, charging stations for e-vehicles contribute to the building’s sustainability performance.

As project manager, Drees & Sommer acted as the intermediary between planners and the principal, allowing fast, goal-oriented decision-making. Challenges during the project included repeated planning sessions and numerous change requests during the execution phase. The experts’ solution was to examine various alternatives in detail and identify the relevant schedule and budget impacts while engaging in close coordination with the client and planners.

As a result, the employees were able to move into the attractive new premises on schedule. The building now serves Fürstenfeldbruck Department of Public Works not only as a place of work, but also as a communications and meeting hub.

The bright and airy lobby area contributes greatly to the building’s open feel.

SOUND OPERATIONAL CONCEPT FOR VULCANO



The striking glass canopies not only give Vulcano a distinctive appearance, but also serve as noise protection.

With its stunning group of three shining black residential towers soaring some 80 meters skyward, Vulcano is a new Zurich landmark.

Client: CSA Real Estate Switzerland (CSA RES), an investment group of the Credit Suisse Anlagestiftung für Vorsorgeeinrichtungen (Investment Foundation for Pension Funds), Zurich | **Project duration:** November 2015 – November 2018 | **Architects:** Dominique Perrault, Architecture, Paris (planning) / Itten+Brechbühl AG, Zurich (execution) | **Drees & Sommer services:** Facility Management during planning & construction, operational planning, procurement of operator services

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“It was great to be the contact person for all operational aspects of such a special project!”

Lukas von Rotz,
Senior Consultant at Drees & Sommer

Three sleek high-rise buildings now soar skyward where cars and motor-boats were produced until the First World War. There are 296 apartments, a 320-room hotel, a supermarket, a daycare center and other commercial premises spread over 26 floors. Drees & Sommer advised the client on all aspects of operations.

CSA Real Estate Switzerland (CSA RES) had the aim of achieving cost-effective and sustainable mixed-use operation of the residential, hotel, retail and office premises. To achieve this, the client relied on the expertise of the Drees & Sommer Facility Management consultants, with whom they had already worked on previous projects. The team was primarily responsible for Facility Management during planning & construction, operational planning, and procurement of operator services. Drees & Sommer also developed the operational concept for the main tenant, aja (Resorts and Hotels), and procured the necessary facility management services.

One of the challenges was the parallel planning of the operational concepts for office and hotel usage. In addition, many elements of the operational concept were only defined after the award to the general contractor, requiring the consulting team to coordinate extensively with them.

Thanks to Drees & Sommer's work, CSA RES now has sound operational concepts and was able to award very specific contracts to facility management service providers. In addition, the market-compliant and broadly advertised invitation to tender for provider services resulted in optimization of operating costs.



Schmidt&Pütz Projektmanagement GmbH

KEEPING RAIL PROJECTS ON TRACK

Projects such as rail systems and railway stations are always executed under extreme time pressure. This is because, in most cases, track closures during works cannot be arbitrarily extended. Infrastructure experts from Drees & Sommer meet this challenge with two innovative approaches.

Lean Site Management is being used for the upgrade of level B of Frankfurt Central Station. The project covers an area of over 61,000 square meters. The modernization of marketing and office space at the station requires work on many mutually dependent measures to progress smoothly.



Despite the complexity of its many different projects, Deutsche Bahn's goals as principal are always the same: The implementation of the planned measures within a very short, fixed timeframe, and planning that is transparent for all project partners.

Drees & Sommer meets these challenges with two innovative management approaches: Agile Design Management (ADM) and Lean Site Management (LSM). ADM aims to achieve interdisciplinary cooperation between all teams and, to this end, involves the individual specialist planners at an early stage of planning. At the same time, there are as few rules as possible to avoid hindering the creative solution process. Lean Site Management transfers the lean approach from industrial production to construction. Standardization and prefabrication – as well as site logistics – play a central role on such lean construction sites.

Despite having specific processes within the individual projects, there is a clearly defined standard process for both approaches that focuses on a common understanding of the project and transparent scheduling.



Board planning allows the work sequence and cooperation between the individual trades to be clearly displayed at the worksite.

In the case of Lean Site Management, the process looks like this:

1. Kick-off meeting:

Information and competence building on LSM, setting project goals.

2. Designing the processes:

Overall process analysis and process planning in workshops with the client, planners and other project participants. Outcome: A transparent week-by-week overall construction process.

3. Board planning:

Transfer of process planning (weekly basis) to board planning (daily basis), control of the execution during track closures through daily checking of the work target. Board planning allows a clear display of the work sequence and cooperation between the individual trades.



Agile Design Management focuses on a team approach and flexibility. For this reason, the experts involve specialist planners in the early stages of a project.

The situation is similar for Agile Design Management:

1. Kick-off meeting:

Information and competence building on ADM, setting project goals.

2. Designing the processes:

Overall process analysis and process planning in workshops with the client, planners and other project participants. Outcome: A transparent week-by-week overview of the schedule for the planning process.

3. Detailed planning of weekly planning:

Weekly follow-up of process planning in regular planner meetings, process optimization, and flexible adaptation to the current situation.

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“Project participants are often skeptical at the beginning of a project because they are not familiar with Lean Site Management or Agile Design Management. But positive outcomes soon convince the doubters.”

Sabrina Müller,
Project leader, Smart Infrastructure at Drees & Sommer

Clearly, the challenge at the beginning is to gain project participants' acceptance of the two methods. To achieve this, Drees & Sommer gets actively involved in coordination with the project teams, addressing the views and concerns of stakeholders and integrating the outcomes into the further process as appropriate. Digitization supports the experts with this task. Meetings alternate between on-site discussions and the use of web-based videoconferencing or meeting systems.



The reversing loop in the Frankfurt subway was also part of the construction work during the brief track closure in the summer.



Lean Site Management helped the experts carry out maintenance work on the urban rapid transit (URT) system at the Frankfurt Airport regional station and Frankfurt Central ...



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“In Lean Site Management projects you have to determine what you have to complete during the track closure – and what can wait. That’s the only way to make the most of the short timeframes.”

Tobias Meurer,
Senior team leader, Smart Infrastructure
at Drees & Sommer

Since 2018, the infrastructure specialists have been using LSM and ADM for several major rail projects – so far with great success.

Projects with Lean Site Management (LSM):

LSM will continue to be used until 2023 during the upgrade of Level B at Frankfurt Central Station. The project covers an area of over 61,000 square meters. Aspects of this inner-city project include upgrading of fire prevention measures, building services equipment and electrical systems, and then optimizing the power consumption of some systems. The experts are also tasked with modernizing marketing and office space and improving barrier-free access. With regard to the urban environment, traffic areas in the surrounding area also require restructuring and upgrading.

The project participants also benefited from the use of LSM during upgrade work on three platforms of the URT station at Frankfurt Airport’s regional station. This enabled completion of all planned works – and even some additional measures – during the track closure.

Drees & Sommer also used LSM to support the Frankfurt Transport Authority (VGF) with work on the URT’s busy A track. The tight summer track closure of only six weeks proved very challenging: 17 track switches, 18 kilometers of cable, 750 meters of track, 2,000 tonnes of ballast and nine kilometers of catenary wire had to be repaired or installed during the short window.

Projects with Agile Design Management (ADM):

Drees & Sommer is using ADM for the new Gelnhausen – Fulda line: Deutsche Bahn plans to build some 45 km of track system there, 31 kilometers of which will run through tunnels, three kilometers over bridges. As the result of new approaches to cooperation between the many project participants during the planning phase, ADM has streamlined processes and increased transparency.

ADM was also used during the construction of the new electronic interlocking system in Kassel in 2019 and 2020. This ensured optimal coordination on the planning side between project participants from all over Germany.

The participants in these projects repeatedly mention Drees & Sommer’s expertise in smart infrastructures, combined with their methodological competence, as success factors that enable the company to provide holistic advice to customers. In addition, the general public is highly appreciative of transport projects that are completed on schedule.

... to maintain operations,
the central platform was closed
and upgraded on one side
at a time.

SUSTAINABLE CONSTRUCTION



“As the world’s largest consumer of raw materials and the source of huge amounts of waste, the construction and real estate industry needs to make changes. For us, Cradle to Cradle® is not only the path to regenerative buildings and products, but also the key to a livable and sustainable future.”

Peter Möslle,
Partner at Drees & Sommer and
Managing Director of EPEA GmbH –
Part of Drees & Sommer

Codeveloped by German chemist Michael Braungart and American architect William McDonough, the Cradle to Cradle (C2C) concept describes the principle of two continuous cycles: Consumables are biodegradable and return to the biological nutrient cycle. At the end of their service life, durable goods are separated into their component source materials and returned to the technical cycle.

Material quality is maintained, so that ‘downcycling’ – that is, recycling with a loss of quality – is avoided. All materials are chemically safe and recyclable. There is no waste in the conventional sense – only reusable ‘nutrients’.

The numerous trees and other plants on the roof terrace, the facade and even in the building itself make the ZIN project a green oasis in the center of Brussels.

Applied to the construction industry, this means designing all structures, systems and building products in such a way that the quality of their ingredients is maintained. Buildings thus become raw material repositories: At the end of their service life, the installed materials become available for further use.



For more than five years, Drees & Sommer and EPEA Internationale Umweltforschung GmbH, founded by Prof. Dr. Michael Braungart, applied this approach when advising principals and investors. As a logical consequence of this close cooperation, the company became part of the Group on January 1, 2019 and now operates under the name EPEA GmbH – Part of Drees & Sommer.

The move has been crowned with success. Supported by EPEA, the **municipality of Straubenhardt** has become the first local authority in Baden-Württemberg to apply the C2C principle to its new buildings. Straubenhardt has embraced C2C since commissioning the design of a new fire station by the Stuttgart-based architectural firm wulf architekten gmbh. The building is scheduled to be completed in early 2021.

The Straubenhardt fire station is one of Germany's first Cradle to Cradle projects in the public sector.



“We are very pleased to be able to support Straubenhardt on its path to becoming a sustainable municipality with its new fire station based on C2C principles. Others buildings will surely follow.”

Daniela Schneider,
Senior Cradle to Cradle
Consultant at EPEA GmbH –
Part of Drees & Sommer

Drees & Sommer's C2C expertise is also in demand internationally. In Brussels, one of the largest projects in the local office market in the last ten years has adopted the Cradle to Cradle approach. Befimmo's **'ZIN project'** consists of two high-rise towers that are being partially demolished and rebuilt to a new design. With its unique mix of residential, office, hotel and coworking space and sports facilities, the ZIN project will make a key contribution to the diversity of the business district. The project has a floor area of over 110,000 square meters.

In addition to managing a material passport for the new towers, Drees & Sommer has provided support for the dismantling, processing and value-adding reuse of recovered materials in other construction projects. To date, over 1.050 tonnes of materials (such as floor coverings, ceilings, partition walls and tiles, as well as insulation, doors and kitchens) have been reused and 140 tonnes upcycled. A Material Passport will certify that the majority of the new materials used are certified to C2C standard or equivalent.

The redesign of the towers specifically addressed local needs in terms of residential, office and public space.



The ZIN project saved around 50,000 truck trips by preserving the core and foundations of the towers.



“The ZIN project is not only one of the biggest projects in the Brussels office market in the last 10 years, but also one of our biggest C2C projects ever.”

Michael Moradiellos del Molino,
Senior Cradle to Cradle Consultant
at Drees & Sommer





From prefab to practice: See the history behind the development of the C2C Lab in this video.



“During the creation of the C2C Lab, it was great to see the extent to which the

Cradle to Cradle approach can already be implemented, thanks in part to the extraordinary commitment of all involved.”

Tobias Fischer,
Senior Cradle to Cradle Consultant
at Drees & Sommer

The Cradle to Cradle concept faces completely different challenges when it comes to renovations and tenant fitout. The Cradle to Cradle NGO wanted to use its new branch office in an old prefabricated building in Berlin to demonstrate that sophisticated interior design demands are no obstacle to a fitout based on C2C. Inaugurated in September 2019, the **C2C Lab** combines the NGO office, an education center and a real-world laboratory. By using only healthy and regenerative products in the renovation of the existing commercial unit – ranging from windows and partition walls to ceilings, paints, furniture and lighting – the C2C Lab is a practical demonstration of the Cradle to Cradle principles.

In addition to construction and project management, Drees & Sommer provided planning services as well as Cradle to Cradle and process consulting for the flagship project. RBSGROUP - Part of Drees & Sommer was responsible for the C2C draft design and interior design.

All these examples demonstrate that Cradle to Cradle already enables the use of future-safe materials. This applies to buildings with a service life of 30 to 40 years – and to an even greater extent to temporary structures such as trade fair booths. That’s why, in 2019, Drees & Sommer designed its booth at Expo Real, Europe’s largest trade fair for real estate and investment, according to C2C principles.

Drees & Sommer used in-house expertise for the **booth concept**, with RBSGROUP experts responsible for design, and EPEA for Cradle to Cradle consulting. Collaborating closely, they developed a booth concept that not only focused on sustainable products such as C2C-certified textiles and luminaires, but also reduced the amount of waste generated to a minimum. The ease of disassembly of structures also contributes to the vision of truly circular economy. For example, after the expo, the steel frame was dismantled and brought to our exhibition booth construction partner’s warehouse for storage – ready to be reused in any number of future trade fairs in the future.



“Sustainability has always been one of our central topics at Drees & Sommer, so it was only logical to make it the focus of our trade fair concept.”

Alexander Strub,
Creative Director at RBSGROUP –
Part of Drees & Sommer
and Marcel Özer,
Senior Cradle to Cradle
Consultant at EPEA GmbH –
Part of Drees & Sommer



Scan this QR code for images and commentary on the booth, as well as information about the materials used.



THE LOGICAL CHOICE FOR LOGISTICS

Client: Böttcher AG, Jena | **Project duration:** October 2018 – Summer 2022 | **Architect:** Bremer Bau, Leipzig | **Drees & Sommer services:** 360-degree analysis, project control during construction and traffic management – including BIM, BSE system planning, preparation of the general contractor invitation to tender, contract award, GC controlling | **Key project data:** Gross volume: 746,744.83 m³, GFA: 85,000 m², 28,000 pallet bays

Böttcher AG has been experiencing strong growth for years. The company's latest requirement was for a new four-storey logistics building at its headquarters in Jena. Drees & Sommer is supporting the client with relevant industry expertise.

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“Our regional colleagues’ logistics experience and a pragmatic approach in keeping with the principle ‘Form follows function’ were the key success factors in the project.”

Janine Dietze,
Head of Logistics at Drees & Sommer

To ensure continued smooth logistics operations, the client has been forging ahead with a project for a 21-meter-high, fully automated high-bay warehouse since 2018. The building has a footprint of some 10,000 square meters and is connected to a four-storey order-picking area with a 20,000 square meter footprint, and a four-storey office building. In addition to on-schedule completion of the project within budget, Böttcher's aim is to ensure that logistics operations are functional and the company is employee-friendly. As a result, the modern complex offers excellent conditions for employees such as logisticians, IT specialists, and office staff.

Before the start of planning, Drees & Sommer undertook a 360-degree analysis of the project for the client. Further services were added later, with Building Information Modeling (BIM) playing a key role. As the property is situated right next to a residential area, the team of experts helped with various measures, including the preparation of a public participation process and the facilitation of public meetings. The BIM visualization of the buildings played a key role in achieving community acceptance of the project. Optimized truck movements along with conservation and greening measures also helped make the new center more acceptable to local residents.

Construction started mid-2020. Drees & Sommer managed to cut investment costs, for example through the development of a high-quality functional performance specification (FPS) and achieving a high level of cost transparency during the GC negotiations. Operating and energy costs were reduced as the result of early BSE system planning and a green roof.



CLIMATE POSITIVE BECOMING A BENEFICIAL COMPANY

In comparison with the situation in financial 2019, Drees & Sommer has reduced and offset its CO₂ emissions in its anniversary year 2020 to such an extent that it has a climate-positive balance. Although climate protection certificates still make a significant contribution to this result, the company will gradually reduce the offsetting. At the same time the company subsidizes the planting of 75,000 trees per year.

In line with our responsibility towards society, Drees & Sommer's sustainability strategy includes keeping an account of the CO₂ emissions generated by the provision of energy to its locations and by company traffic and transport. Among others, the initiative myclimate supported us.

The company's annual CO₂ emissions convert to around 3.75 tons per staff member. Business travel and the company vehicle fleet account for the largest proportion of the emissions, at more than 80 percent. The remaining portion is caused by the use of energy to operate the office buildings. Based on these calculations Drees & Sommer is now stepping up many of its measures to avoid and reduce fossil fuel emissions generated by its operating processes across all corporate divisions:

- › We have been covering the electricity needs of all the German office locations and the company's own electric vehicle charging stations by renewable energy from Greenpeace Energy since 2012.
- › In 2019, to make our business travel more climate friendly, we introduced a sustainable travel guideline which stipulates, among other things, that staff members have to travel by rail as an alternative to short-haul flights.
- › We gradually change our vehicle fleet over to alternative fuel vehicles. And encourage environmentally-friendly cars with a CO₂ bonus.
- › We are also promoting climate-friendly mobility by offering local public transport subsidies as well as a shuttle bus, bicycle leasing and car sharing.

What does "climate positive" mean? We not only reduce our CO₂ emissions and completely offset the remaining ones. We also "take" additional CO₂ from the atmosphere.



'The international initiative with Swiss roots is a global quality leader in voluntary carbon offsetting measures. Through projects of the highest quality, myclimate promotes quantifiable climate protection and sustainable development worldwide. Emissions are reduced by replacing fossil fuel sources with renewable energy, implementing local reforestation together with small-holders and by applying energy-efficient technologies.'

Website: myclimate.org

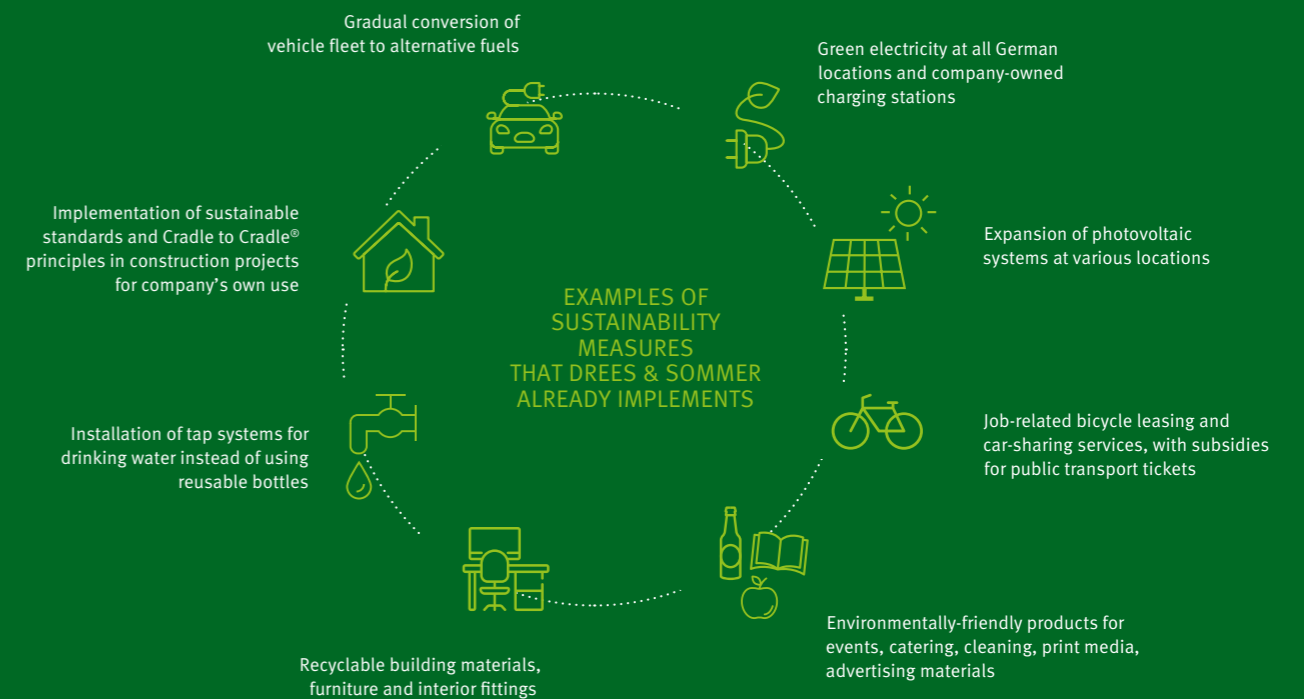
3.75
TONS
The company's annual CO₂ emissions per staff member

Sustainability is more than Carbon Offsetting – Payback Comes Quicker than Expected

The majority of our measures to become a climate positive company are also beneficial from an economic point of view. For instance, an investment of around EUR 35,000 to convert to a tap system for drinking water at the Stuttgart location instead of using reusable plastic bottles has already paid for itself after 18 months.

Additionally, we now only use organic and environmentally-friendly products for events, catering, cleaning, print media and advertising materials, and also in its staff restaurants. In refurbishments or new buildings, as well as at exhibitions and trade fairs, we rely on recyclable building materials, furniture and interiors. At the recent international trade fair for property and investment, Expo Real, we showed in our zero-waste fair booth, based on the Cradle to Cradle® principle, how these concepts can be implemented.

The continuous investments we have made in digital communication, processes and methods in the past are currently proving very effective. For us, virtual meetings with clients and digital communication solutions work perfectly in most areas. More than 3,100 employees are currently fully equipped to work digitally at the same time and from home workstations. Carbon-intensive business trips are becoming less common.



Active Role in the Environment and Society

By implementing these and other measures, Drees & Sommer is continuously reducing its carbon footprint and increasing its contribution to global climate protection. To achieve a positive climate footprint, we are also financing the planting of 75,000 trees per year by the global children and youth initiative Plant-for-the-Planet, which will result in the absorption of an additional 15,000 tons of CO₂ per year. Drees & Sommer's support will also enable young people to be educated and supported as ambassadors for climate justice.



GOAL OF PLANT FOR THE PLANET:

PLANTING 1 BILLION TREES

'The children's initiative Plant-for-the-Planet was initiated in 2007 by 9-year-old Felix Finkbeiner. Inspired by Wangari Maathai, who planted 30 million trees in Africa in 30 years, Felix formulated his vision: children could plant one million trees in every country on earth and in doing so, offset CO₂ emissions all on their own, while adults are just talking about it. Each tree that is planted removes CO₂ from the atmosphere. The first tree is planted and Klaus Töpfer, executive director of the United Nations Environment Programme (UNEP), becomes official patron.'

Website: plant-for-the-planet.org

75,000 TREES

are planted by us per year



Becoming a Beneficial Company

In addition to climate protection, we keep on increasing our involvement in social projects. In 2020, for instance, to celebrate our 50th anniversary we are supporting 50 social and sustainable projects. Our long-term goal is to be a Beneficial Company.

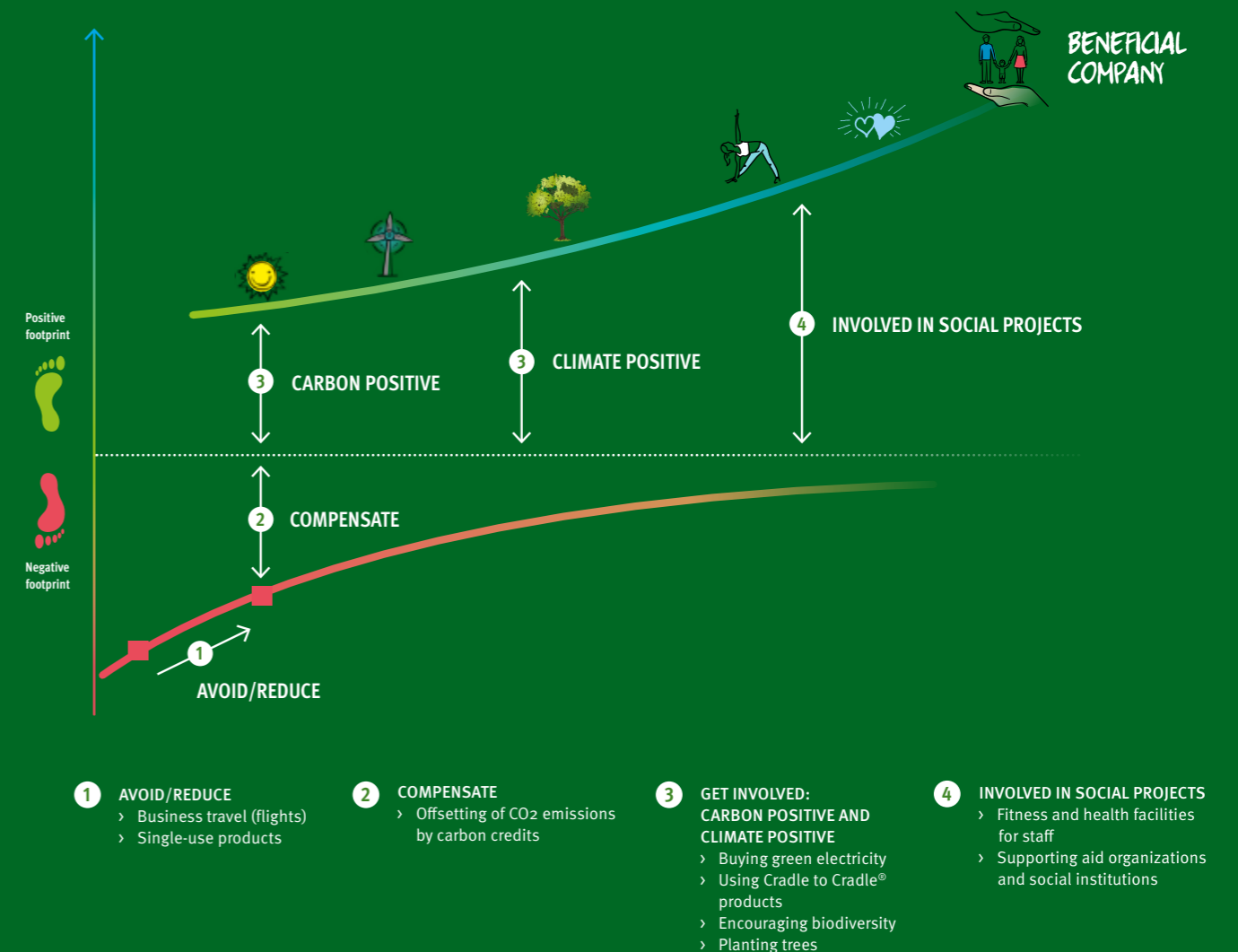
Becoming climate positive is just the first step. Clear measures for further reductions in CO₂ emissions are also defined in Drees & Sommer's *blue way* concept. These include social and societal involvement in order to make a positive contribution also in this area. It is therefore very important to simply get on with it. Only when companies in all sectors have successfully taken these steps – in other words, when they are also on their way to becoming a Beneficial Company – the world will be prepared for the next generation.

As a Beneficial Company, we give more back to the environment than we consume from it through our business activities. In this regard, we make long-lasting positive contributions to the environment and society while bringing about maximum benefit in these areas. Requirements for Beneficial Companies include:

- > Planting trees
- > Saving CO₂
- > Orientation towards the Sustainable Development Goals (SDGs)
- > Application of future-oriented concepts such as Cradle to Cradle or Blue City



Climate positive in a musical way? Listen and be surprised!





OFFICE DESIGN SHOWS PASSION FOR REAL ESTATE

Client: RNHB, WTC Utrecht, Netherlands | Project duration: June 2018 – Feb 2019 |
 Architect: ATC Schoordijk Interieurontwerp, Utrecht | Drees & Sommer services: Site analysis,
 design, project management for fitout | Key project data: GFA or leasable area: Approx. 2,660 m²,
 Construction cost: €1.9 million

RNHB is an independent real estate finance company in the Netherlands. The company has now moved into upscale new premises in the World Trade Center in Utrecht, which were completed in 2018.

Given the company's growth, RNHB decided to consolidate its various offices in a central location in Utrecht. It wanted large, well-appointed premises that would promote employee cooperation and to which staff would be happy to invite customers. And the new headquarters were also to reflect RNHB's enthusiasm and passion for real estate. The Dutch Drees & Sommer team supported RNHB with the search for and selection of a suitable location and the subsequent implementation of the construction project.

The refreshingly modern look of RNHB's new premises in the World Trade Center in Utrecht.



The new premises feature an attractive mix of old and new fitout and furnishing styles.



With the new office RNHB aims to be perceived as an attractive employer for current and future employees. A modern look is created by adding colour and fun elements such as the swings.



The new office provides a multitude of spaces for meetings, brainstorm sessions and collaboration. The water bar is a central point in the office where employees briefly meet and interact.



“The new central office is an emphatic expression of RNHB’s corporate culture.”

Pim Prins and Linda van Ruiten,
Project team at Drees & Sommer
Netherlands

First, the experts carried out a site analysis. The customer chose a 2,660 m² area on the 9th and 10th floor of the recently completed World Trade Center in Utrecht. RNHB continued to rely on the Drees & Sommer expertise. The Dutch team coordinated construction work and managed the fit-out of the rented space. The project management experts created a streamlined and efficient communication structure that came together with the customer during a weekly project team meeting. A success factor was close collaboration with the interior designers and RNHB. So, RNHB was able to move into the building five months after the start of the project.

The lounge with the internal staircase between the two floors as the central meeting point, atmospheric and functional meeting rooms, together with house-shaped boxes for short and informal meetings offers the property every opportunity for a productive working day. A table tennis set allows staff to relax away from the desk during breaks. The new office fully reflects the spirit of RNHB: modern and invigorating!

RNHB's project team together with the architect created a design with real estate as a central theme.

A MODERN LOOK FOR MUNICH'S HISTORIC INDUSTRIAL ZONE

Munich's historic Werksviertel (factory district) is gradually developing into a diversified urban neighborhood. R&S Immobilienmanagement GmbH, part of the Rohde & Schwarz technology group, is playing a major role in the 'iCampus im Werksviertel' (iCampus in the factory district) project.

Rohde & Schwarz is headquartered in the Munich Werksviertel and owns a substantial part of the precinct. Rather than creating an office-only district, R&S Immobilienmanagement GmbH set itself the goal of developing the iCampus into a diverse urban district for living and working.

Client: R&S Immobilienmanagement GmbH, Munich | **Project duration:** July 2017 – 2022 (anticipated)
Architects: Plaza: Chapman Taylor, Dusseldorf / Alpha, Beta, Gamma: RKW Architektur +, Dusseldorf and KAAAN Architekten, Rotterdam / iCube central cooling plant: LMT3 Architekten, Munich / Rhenania: HENN Architekten, Munich and landau + kindelbacher, Munich (heritage-protected villa) |
Drees & Sommer services: Energy control concept, building services equipment (BSE), BSE planning of central cooling plant, system planning, energy design, facade engineering, building physics, general construction management, infrastructure, construction logistics, site coordination & monitoring, integrated construction management, lean site management, invitation to tender and contract award |
Key project data: BGF (above ground): 110,000 m²

In addition to the Plaza (top left) and the Alpha, Beta and Gamma buildings (center), the Rhenania project clustered around the heritage-protected villa (bottom right) and the future Delta and Epsilon projects form part of the new quarter.





Generous internal spaces in the Alpha, Beta and Gamma buildings will create vibrant work environments that promote communication.



“The trusting and respectful cooperation with R&S Immobilienmanagement GmbH is an essential success factor for us. It’s been great to see how the shared vision continues to be realized with each follow-up project since we joined the Plaza project.”

Tobias Sailer,
Project Team Manager at Gassmann +
Grossmann Baumanagement GmbH –
Part of Drees & Sommer



“We are proud to be contributing to the demanding transformation of the Werksviertel – and to be jointly implementing innovative solutions, such as central cooling plant using ammonia machines.”

Markus Treiber,
Associate Partner at Drees & Sommer
and Boris Maticic,
Partner at Drees & Sommer and
Managing Director of Gassmann +
Grossmann Baumanagement GmbH –
Part of Drees & Sommer

Following positive experiences, Drees & Sommer was also able to impress the client with the follow-up project and won the competition for the three **office buildings Alpha, Beta and Gamma** jointly with RKW Architektur +. With an above-ground floor area of some 40,000 m², these offer space for future-oriented work environments, with features including loft spaces with a floor-to-ceiling height of 4 meters, spacious recessed balconies, roof terraces, and green open spaces. The concept impressed potential users, with the result that the three buildings were fully leased even before construction began in February 2020, with completion scheduled for early 2022.

The Drees & Sommer engineering experts are planning the building services equipment, facade and building physics from the determination of basic design data right through to inspection & acceptance. g² was also awarded the contract for integrated construction management and other services such as construction logistics in a series of follow-up orders. With regard to external plant, the team worked with their infrastructure colleagues to develop the supply and disposal concept, thus laying the groundwork for the cooling system.

Here, R&S Immobilienmanagement GmbH and Drees & Sommer took an innovative approach, opting for a district cooling system. Several challenges had to be overcome: The regulatory authority’s strict requirements resulted in a very unusual cubage – the entire central cooling plant had to be installed underground – and the completion dates for the future users led to a very tight timeline. Dubbed the **iCube**, the central cooling plant was taken into operation on schedule in the summer of 2019, and has been providing district cooling for the entire quarter ever since.

But the development of the Werksviertel doesn’t stop there. R&S Immobilienmanagement GmbH continues to work on realizing its vision for the district – with full support from Drees & Sommer, of course.

The iCampus is the creative expression of the Munich Werksviertel’s new look.

FIRST MINISTRY TO GO CLIMATE-NEUTRAL

The Federal Ministry for Economic Cooperation and Development (BMZ) is to become the first climate-neutral federal authority in Germany. Drees & Sommer has played a key role in laying the groundwork for this achievement.



Client: Partnerschaft Deutschland PD – Berater der öffentlichen Hand GmbH (public sector consultants), Berlin / Federal Ministry for Economic Cooperation and Development (BMZ), Bonn / Institute for Federal Real Estate, Bonn |
Project duration: March 2019 – December 2019 | **Drees & Sommer services:** Carbon consulting, energy concept | **Key project data:** Number of buildings: 10, GFA: Bonn: 68,000 m², Berlin: 40,000 m², Refurbishment costs: Approx. €35 million gross



Modernization of buildings, plant and equipment is essential to achieving climate neutrality. The BMZ will be able to reduce its emissions by 75 percent by upgrading the buildings at its headquarters in Bonn.

Johannes Hopf,
 Manager Energy and Sustainability
 at Drees & Sommer

The BMZ is the highest authority responsible for development policy in the Federal Republic of Germany. As part of its work, it supports numerous climate protection and resource conservation projects and initiatives. To further advance this cause, in 2017 the BMZ initiated its 'Climate-Neutral BMZ 2020' project with the goal of avoiding, reducing or offsetting its greenhouse gas emissions to achieve climate neutrality. To this end, the ministry had the Drees & Sommer specialists assess its buildings in Bonn and Berlin to identify potential for energy savings and carbon emissions reductions.

As part of a real estate energy concept, the team examined four heritage-listed main buildings and other historic annexes at the ministry's headquarters in Bonn, as well as the Deutschlandhaus and the Europahaus in Berlin. In addition to the buildings themselves, the sustainability experts assessed the existing plant and equipment for optimization potential and developed suggestions for their improvement.

The findings showed, for example, that the BMZ's energy consumption at its headquarters in Bonn can be reduced by some 50 percent. Switching from district heating to heat pumps would allow carbon emissions to be reduced by a further 20 percent. Overall, savings potential of some 75 percent was identified.

The recommended upgrade of the buildings, plant and equipment is to be undertaken in stages over the coming years. Some of the measures will pay for themselves in less than ten years.

On January 1, 2020, the BMZ started its initiative of avoiding and reducing emissions wherever possible, and offsetting any remaining emissions. This project demonstrates that climate neutrality can be achieved for established buildings – and that it can also be economically viable, even for heritage-protected buildings.

SUCCESSFUL SALE OF THE MILLENNIUM PORTFOLIO



The real estate experts found modern technology in a heritage building on Sendlinger Strasse in the heart of Munich.



Drees & Sommer developed future scenarios for the Norderstrasse 101 building in Hamburg, the largest property in the portfolio by far.

Extensive technical due diligence is required before a multibillion-dollar real estate portfolio changes hands. The Real-Estate-Consulting team at Drees & Sommer examined the nearly 50 properties in the vendor's portfolio on its behalf, and provided advice on the transaction.

The Millennium portfolio comprises a total of 26 office buildings, 14 apartment buildings and 9 retail properties in Berlin, Düsseldorf, Frankfurt, Giessen, Hamburg, Cologne, Leipzig, Munich, Stuttgart and Unterhaching. The deal was the biggest property-only transaction in Germany in 2019.

Originally, the Millennium portfolio belonged to what was then Generali Lebensversicherung AG, which was then acquired by the Viridium Group in 2019. A leading specialist in the efficient management of life insurance portfolios, the Viridium Group subsequently decided to sell the real estate portfolio.



A Hanseatic Art Nouveau jewel directly on the Bleichenfleet canal: Drees & Sommer's verdict for the traditional Kontorhaus office building, which dates back to 1907, was positive.



This modern commercial building near Munich's Theresienwiese was also part of the portfolio.

This Frankfurt office building was extensively refurbished 25 years ago.



Unmistakably Berlin: The real estate experts carried out a thorough inspection of the high-rise building Potsdamer Platz 5.



There is a view of the European Central Bank headquarters from this Frankfurt residential building.



A building in Frankfurt's prestigious Westend.

Client: Viridium Group, Neu-Isenburg | Project duration: April 2019 – September 2019 |
 Drees & Sommer services: Technical vendor due diligence, feasibility study |
 Key project data: Leasable area 352,000 m²



“Preparing a megadeal like this quickly and flexibly is technically demanding – and a requires huge team effort.”

Grzegorz Pieluzek,
 Senior Consultant
 at Drees & Sommer

Expertise was the clincher: The Viridium Group chose to work with Drees & Sommer to successfully complete the sale of the real estate portfolio. The Real Estate Consulting team's task was to inspect the properties and provide a clear indication of risks and their financial impact. Drees & Sommer also prepared a feasibility study for a property in Hamburg.

The virtual sales data room – the core element of every due diligence project – needs to be clearly structured so that potential buyers can quickly find all the information they require and take it into consideration in their decisions. The real estate consultants reduced the vendor's workload by organizing the documents relating to building regulations in the sales data room.

The team captured and systematically structured the multifaceted real estate portfolio. In the process, they identified key issues to support the client's decision making. In the case of structural defects of unexplained cause, the team recommended courses of action. It was also able to respond quickly and flexibly to short-term changes in the property inspection schedule. The real estate experts from Drees & Sommer were able to make full use of their communication skills when coordinating with the various players – such as the vendor's transaction experts.



PRESTIGE PROJECT BACK ON TRACK

Planning changes, poor communication, and confusion regarding responsibilities led to project delays for AW Rostamani's mixed-use complex in Dubai. Drees & Sommer is getting the project back on schedule.

Dubai-based AW Rostamani has been planning the construction of a mixed-use project since 2013. A commercial, office and hotel complex with two retail levels, ten floors of office space, plus a 4-star hotel and hotel and residential apartments is taking shape in the residential and business district of Mankhool. Various design changes in recent years and the lack of project structure and clearly defined responsibilities led to a situation where, after three years, only 25 percent of the project had been completed. For this reason, the principal commissioned Drees & Sommer to provide project and construction management services to rapidly make up for lost time and finish the project within budget. Drees & Sommer project managers have successfully completed various projects for AW Rostamani in the past.

A modern commercial, office and hotel complex is taking shape on Dubai's Khalifa Bin Zayed Road.



The project is scheduled to be completed by the end of 2020.



Client: AW Rostamani Group | **Project duration:** August 2013 (design) – October 2020 (construction) | **Drees & Sommer services:** Risk management, project monitoring, site management, cost and schedule controlling, project management, value engineering, contract management, supplementary claims management | **Key project data:** GFA: 90,620 m²



“Thanks to our strong project management team, schedule and budget goals are once again within reach.”

Tobias Florian Heilig,
Drees & Sommer project
team leader in Dubai

Experienced Drees & Sommer project and site managers have taken over responsibility for the project and construction site management, and act as the central interface for all project participants. Direct and open communication, combined with detailed reporting, ensure project transparency and enable rapid decision-making. As no standard contractual framework was in place, the interdisciplinary team established a new contract management system. Drees & Sommer has been tasked with bringing the seriously delayed project to completion in just 18 months with stringent cost and schedule management. To this end, the design was revised to make it more practical, and a technical and financial performance simulation was undertaken for the entire life cycle to achieve cost savings. The project managers also updated the construction program and set clear milestones.

This allowed Drees & Sommer to hand over the finished office, residential and retail premises to AW Rostamani at the end of 2019. Final handover of the hotel and hotel apartments is scheduled for the end of August 2020, which is within the planned timeframe.

Thanks to the extensive range of measures and comprehensive consultation, the project is back on track after considerable delays.

The mixed-used project combines residential, leisure and commercial elements in three towers.

SUPPORT FOR A SECTOR UNDER PRESSURE

The healthcare sector was experiencing strong growth even before the coronavirus pandemic hit. But the challenges, in particular those faced by hospitals and clinics, are huge. Drees & Sommer has been a recognized expert in this sector for many years.

Services provided to the Basel University Dental Clinic included the development of a comprehensive digitization strategy.

Even though the ubiquitous coronavirus crisis has increasingly focused public attention on hygiene in hospitals and nursing homes, the industry has to overcome other major challenges. These include the all too frequent backlog in the renovation of building fabric and technology, a decrease in the duration of hospitalizations, and the associated reduction of floor space. But it also faces the central task of the modern era, namely that of implementing digital technology and artificial intelligence (AI) in a way that is beneficial for patients, hospital staff and operators.





Construction of a new Basel University Center for Dentistry (UZB): Client: Basel University Center for Dentistry | Project duration: January 2016 – July 2019 | Architect: BUR-Architekten, Zurich | Drees & Sommer services: Planning of and advice on medical technology | Key project data: Cost: Approx. CHF 87 million

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“The Basel University Center for Dentistry benefits greatly from consolidation of its clinics: Processes are more efficient, potential for improvement can be realized, and the technology is future-proof.”

Ulrich Uetz,
Senior team leader Healthcare
at Drees & Sommer

Modern workplaces,
common rooms, and lecture
halls create an optimal work
environment for staff.

Drees & Sommer is playing a central role in two hospital projects in **Basel**. The Drees & Sommer team took on the role of consultant for operational and hygiene processes for the **Basel University Center for Dentistry's new building**. The specialists were able to make a substantial contribution with their acknowledged expertise in the field of medical planning. The project, which ran until 2019, encompassed 89 treatment units (dental chairs), two rooms for minor procedures, dental X-ray machines, a dental laboratory, 34 workplaces for phantom dentistry, and an innovative central supply department for sterile materials including logistics. The goal was to centralize the city's three dental clinics in a modern, efficient and architecturally attractive building. In addition to providing cost and schedule stability, the experts defined a hospital-wide digitization strategy that led to the networking of all treatment, x-ray and logistics units.

The team will be supporting the construction of the new building for the **University Hospital in Basel** until 2026. The decision to rebuild was taken because remediation of the established buildings was no longer economically viable as the existing workplaces and fire prevention measures were no longer compliant with statutory requirements. An additional aim was to achieve a significant increase in the hospital's capacity. Located in the city center, the project is being executed in two construction phases, with the hospital remaining in full operation. This means stricter than usual requirements on noise emission and vibration prevention. Although the Drees & Sommer healthcare professionals initially joined the project as consultants to the principal, they are now also working as project controllers and BIM consultants, as well as helping with the development of a real estate strategy for the entire site.

Construction of a new Basel University Hospital building: Client: Basel University Hospital | Project duration: 2015 – 2026 | Drees & Sommer services: Client consulting, project control, BIM consulting, contract negotiation, real estate strategy for the entire site | Key project data: Cost: Approx. CHF 1.2 billion



Close coordination between the project participants was a key success factor during the planning and construction of the Vitos Clinic.

Construction of a new Vitos Clinic building, Hamburg: General planner: SKA Sibylle Kramer Architekten BDA, Hamburg | Project duration: August 2018 – November 2020 | Architect: SKA Sibylle Kramer Architekten BDA, Hamburg | Drees & Sommer services: Site coordination & monitoring, health & safety coordination, review of supplementary claims | Key project data: Construction cost: €20 million



“Basel has traditionally been an important hospital location, so we are pleased that we often have the opportunity to support institutions with our expertise.”

Rainer Preissshofen,
Associate Partner
at Drees & Sommer

The Drees & Sommer healthcare specialists have experience in these and similar roles, for example, through their involvement in the construction of the new **Vitos Clinic building in Bad Homburg**. The team's rapid response and provision of professional support with planning collisions and cost blowouts ultimately led to the successful completion of the project. The team coordinated closely with the commissioning architect and other project participants, and provided services including the development of detailed LCM process plans. Drees & Sommer documented defects with photos, and tracked their elimination using the Contrace application.

Basel University Hospital's new premises are being built in two phases, adding a striking new building to the hospital complex





Refurbishment of the Münster University Hospital (UKM): Client: Münster University Hospital Infrastructure Management | Project duration: July 2014 – December 2020 | Architect: Kleihues + Kleihues, Dülmen Rorup | Drees & Sommer services: Facade technology, energy design | Key project data: Cost of facade: Approx. €21 million



The facade experts optimized the energy design of the new structure using thermal simulation.

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“The planning and execution of the facade during ongoing hospital operation proved quite challenging. But we mastered it successfully thanks to having the right tools and a great team.”

Jürgen Einck,
Associate Partner
at Drees & Sommer

The striking twin towers of the Münster University Hospital presented the experts with very demanding design and manufacturing challenges.

Drees & Sommer also contributed expertise for the refurbishment of the **Münster University Hospital (UKM)**. The twin towers of the complex were taken into operation in 1983 and are one of the city's landmarks. Drees & Sommer supported the client and the winners of the 2013 architectural competition by providing specialist engineering services for facade technology. The facade planning required solutions to some complex functional, design, manufacturing and installation challenges. A further problem was that the 'new' facade had to be developed, designed and installed on an extremely confined construction site while the hospital remained in full operation.

The former guest restaurant has been converted into stylish meeting rooms.



SYNERGY AT WORK IN BASEL



“Synergy effects enabled structured remodeling to be successfully completed.”

Axel Hatzsch, Marcel Stark and
Nils Hoffmann-Schoenborn,
Drees & Sommer's Syngenta project team

Syngenta is one of the world's leading companies in the agribusiness sector. The Board of Directors and interdivisional units are located at the company's headquarters in Basel's Rosental precinct. Ownership of the Rosental Works – Basel's oldest chemical precinct – passed to Syngenta when the company was founded in 2000. In 2007, Syngenta sold parts of its former precinct property, retaining a 2.5-hectare core area for consolidation of its facilities. In 2019, Syngenta sold a further 23,600 square meters of land, including the properties on it.

Upon the sale of the remaining part of the Rosental precinct, Syngenta decided to relocate management from the historic main building to the former guest restaurant in order to be closer to its business operations. In addition to project controlling and delegable client tasks, Drees & Sommer was commissioned with general planning and General Construction Management (GCM) for the necessary remodeling and design work on the premises for use by the Board of Directors.

Interdisciplinary project teams undertook complete implementation of the measures, providing project management and planning services as well as a permanent on-site construction management team, enabling them to exploit a wide range of synergies. The project managers conducted workshops with the client to develop a comprehensive user requirements specification. As the relocation date was set by the termination of the lease agreement for the historic main building, the team had to meet an ambitious schedule – as well as a predefined project budget. Remodeling work commenced in June 2019 and was already completed in September.

The tight project deadline and the large number of trades on site required an agile approach with Lean Construction Management. In order to meet the budget, different execution variants were considered during planning and tendering. As a result, the tender documents contained multiple items, with options such as retaining existing building fabric with a high degree of reuse and a new variant involving demolition and replacement. This approach allowed the principal to select the optimal variant with regard to schedule, cost and quality.

Completed within budget and to the specified quality, Drees & Sommer handed over the conversion project completed to the client's complete satisfaction on schedule on September 30, 2019.



Successful conversion despite time pressure: Drees & Sommer coordinated remodeling and relocation to redesigned premises for agribusiness company Syngenta.

The Syngenta headquarters have been redesigned to meet user requirements.

Client: Syngenta Crop Protection AG | Project duration: November 2018 – October 2019 |
Architect: Erny & Schneider AG, Basel, Switzerland | Drees & Sommer services: Client representation/ delegable client tasks, general construction management (GCM), requirements management, procurement management, lean construction management (LCM), coordination of relocation | Key project data: GFA: 850 m²

CJEU SETS ITS SIGHTS HIGH

After years of using various leased buildings, the Court of Justice of the European Union (CJEU) is bringing all judges and services together at a central location in its Palais de Justice on the Kirchberg. What is now the tallest building in Luxembourg was completed on schedule and within budget as part of the CJEU's fifth expansion stage.

The group of high-rises on the Kirchberg plateau join to form a harmonious skyline.





Nestling next to what is now Luxembourg's tallest building with its black facade ...



... is another tower, whose color, shape and height ...



... are reminiscent of the Court's preexisting golden twin towers.



The impressive facade of the golden part of the building represents library shelves, with windows suggesting gaps in the rows of books.



“It is mainly thanks to our well-attuned team and proximity to the customer that we succeeded in completing the tallest building in Luxembourg on schedule and within budget.”

Maximilien Ast,
Associate Partner at Drees & Sommer
and Isabelle Wertz,
project team leader at Drees & Sommer

Client: Court of Justice of the European Union (CJEU), Luxembourg |
Project duration: November 2013 – July 2019 | Architect: Concept: Dominique Perrault, Paris, Execution: SRA, Paris, Jean Petit Architect, Luxembourg |
Drees & Sommer services: Technical consulting, monitoring, technical & economic construction consulting, technical & economic controlling, data management |
Key project data: GFA: 56,500 m², Construction cost: Approx. €144 million

After years during which some judges and services were accommodated in leased buildings, the European Court of Justice's building complex on the Kirchberg plateau in Luxembourg has now been extended for the fifth time to allow all staff to be united under one roof. The new third tower was built under the direction of the Luxembourg Administration des bâtiments publics to the design of French star architect Dominique Perrault, who was also responsible for the design of the first two ECJ towers of the previous expansion stage. Execution was entrusted to the consortium of SRA- Architects and Jean Petit Architect.

Thanks to the well-established and experienced team and a competitive bid following a public tender process, the European Court of Justice commissioned Drees & Sommer as consultants to ensure smooth completion of the ambitious project. The close, local support provided by the Luxembourg Drees & Sommer regional office was particularly beneficial. This facilitated coordination between the user – the CJEU – and the Grand Duchy of Luxembourg in its capacity as principal, and enabled fast and competent responses to any questions arising.

By providing services including technical & economic construction consulting and controlling, as well as close monitoring, the Drees & Sommer experts contributed to the timely completion of the project within budget, enabling the new users to move in on schedule. The usable area of approximately 42,600 square meters is for the exclusive use of the administrative staff of the Court of Justice.

At 115 meters, the new tower is now Luxembourg's highest building – a record previously held by its direct neighbors, the CJEU's twin towers. The inauguration ceremony was held in September 2019 in the presence of Grand Duke Henri.



INNOVATIVE CONCEPT PUTS CITY BLOCK A NEW LEASE OF LIFE

Client: Flanders Stuttgart S.à.r.l., Stuttgart managed by J.P. Morgan Asset Management, Frankfurt |
Project duration: December 2019 – April 2021 | **Drees & Sommer services:** Feasibility study, support of lease negotiations, BSE planning, facade optimization, integrated planning, workplace consulting, brand architecture, redevelopment, General Construction Management (GCM) |
Key project data: GFA: 58,000 m², investment volume: €65 million

Through the close cooperation of a range of experts, Drees & Sommer is achieving the repositioning of an inner-city precinct in Stuttgart that was starting to show its age. And, following the redevelopment, the company is ensuring certainty of project execution with a feasibility study and GCM.

A vibrant urban space is to be created around the new and renovated buildings.



The square in front of the building literally invites people to have an ice cream or coffee together.



This draft design for the new building focuses on full transparency.

The canteen should become an open and friendly place to meet.



In spring 2019, the client commissioned Drees & Sommer with a feasibility study for the repositioning of an office property in the east of Stuttgart, the state capital of Baden-Württemberg. Based on the results of the study, the company developed a viable concept for the future of the entire precinct. A team also assisted the client with upcoming lease negotiations. Layout planning and a holistic redevelopment concept were projected for the site – including an architectural design for the established building and for a potential new development.

Clear courses of action were recommended to the owner. The experts also developed facade studies as well as addressing new layout solutions for multispaces and individual workplaces. Until then, the standard of the building complex was largely that of the 1980s and 1990s. The office block had a conventional cellular structure, and the shell consisted mainly of clinker with a sheet-metal mansard roof. This posed a range of challenges for the construction and specialist engineers, real estate consultants and architects from various Drees & Sommer divisions.

The first was to analyze the current state of the area and the existing building to identify the requirements for a smart redevelopment concept. The analysis was rounded out by an exploration of the extent to which the subdivision of buildings is possible.



“We are using the distinctive ambience of the area and systematically rethinking existing architecture. As a result, the precinct is gradually taking on a new look, with future-proof asset value being created at the same time.”

Moritz Unterstab, Dirk Kahl,
Giulio Castegini, Patrick Kraft
and Irene Sieben –
the Drees & Sommer project team

Drees & Sommer experts for user experience were able to demonstrate that user well-being in the office space can be significantly improved, for example by dismantling the cubicle offices and using high-quality materials. Working with their engineering colleagues, they also showed how a new BSE concept would support this transformation. At the same time, specialists developed solutions for optimization of the facade design – and optimized cost and with a minimum of alterations.

General Construction Management (GCM) was chosen to implement the measures. This model enabled the specialists to start planning the work and manage the invitation to tender and contract award. The implementation phase for the renovation work began in spring 2020. Drees & Sommer is currently preparing the outline planning application for the new building.

ACTIVE PARTNERS, PROJECTS, AND INNOVATIONS

1970

1980

1990

1999

2000

2001

2002

As a partner-managed company –
Drees & Sommer has been a success story
for decades.

Many key construction projects and
innovative achievements represent
milestones in the history of this highly
collaborative enterprise.

POTSDAMER PLATZ, BERLIN

The new center of Berlin was created on schedule and within budget in a period of just five years from the initial idea to commissioning. On behalf of the investor, **Professor Dr. Hans Sommer** (Partner and Member of the Supervisory Board) coordinated the construction of this functionally, architecturally, technically and ecologically sophisticated urban quarter.



INDUSTRIEPARK NORD / BMW LEIPZIG

The city commissioned **Jörg Wohlfarth** (Partner, Leipzig) to undertake all site development work for BMW's new plant in Leipzig. The major challenge was the excavation of three million cubic meters of mineral soil, and its replacement and compaction in layers.



KRONEN-CARRÉ, STUTTGART

At the end of the 1990s, the insurance company SV Versicherung decided to modernize this city block in Stuttgart. **Stefan Heselschwerdt** (Partner, Cologne) was responsible for the complex revitalization project – which triggered the founding of g2 – Part of Drees & Sommer.



PROJECT CONTROLLING FOR RKW ARCHITECTS

Gabriele Walker-Rudolf (Partner, Finance Corporate Unit) ensured the transparency and structure of projects for the architectural firm RKW by introducing DS-Pro project controlling software.



LANDESBANK BADEN-WÜRTTEMBERG

As project manager, **Rino Woyczyk** (Partner, Life Sciences Industry) was not only able to meet the client's demanding ecological and business requirements, but also succeeded in motivating all the project participants with site get-togethers and open communication.



KUNSTMUSEUM STUTTGART

Andreas Schele (Partner, Construction Management) succeeded in implementing high-end architecture within budget and schedule constraints for the Stuttgart's art museum, which can accommodate a wide range of exhibitions in its distinctive cube-shaped building.



MESSE STUTTGART

The challenge of executing a major project in the full glare of public attention was taken up by **Thomas Jaißle** (Partner, Project Management). The result was praise at national level, enthusiastic users, and happy local residents.



TRUMPF DITZINGEN

A high level of architectural sophistication coupled with a complex self-supporting glue-laminated timber roof structure made considerable demands of **Boris Maticic** (Partner, Construction Management) with regard to process and construction execution methodology – as can be seen by the result!



SKY OFFICE, DUSSELDORF

Björn Jesse (Partner, Hamburg) coordinated the land-use planning process and the urban planning contract for the Sky Office. His goal-oriented project management approach brought the various planning partners together in a team characterized by mutual respect.



2003

2004

2005

2006

2007

2008

2009

2010

HÔPITAL KIRCHBERG

By completing the Hôpital Kirchberg on schedule and within budget, **Frank Reuther** (Partner, Munich) established the Group's project management service in Luxembourg – the Drees & Sommer regional office there was founded the same year.



MERCEDES-BENZ MUSEUM

This project under the leadership of **Dierk Mutschler** (Partner and Member of the Executive Board) delivered an architectural and technical highlight for the client. Thanks to professional project management it was completed on schedule and within budget despite its extreme level of complexity.



APOLLO THEATER SIEGEN

This first building partner model for the public sector maintained part of the original building fabric – without which implementation would not have been possible. **Bernhard Unsel** (Partner, Stuttgart) managed the construction project within the guaranteed cost framework.



TENNET OFFSHORE GRID CONNECTIONS

Christopher Philipsen (Partner, Smart Infrastructure) implemented numerous grid connections for North Sea wind farms – including for TenneT – while at the same time expanding the Drees & Sommer Energy industry team.



DEUTSCHE BANK TOWERS

During renovation, the exterior architecture was carefully enhanced, while building services equipment and interior design underwent extensive upgrades.

Marc Schömbs (Partner, Frankfurt) was responsible for the Green Building multiproject, which was one of the first to reach the highest DGNB and LEED certification levels.



2011

MERCEDES-BENZ PLANT, HUNGARY

With the support of a German-Hungarian project team, **Philipp Späth** (Partner, Stuttgart) oversaw the construction of this new production plant on a 180-hectare site – with facilities including a pressing plant, logistics center, paint shop, and assembly.

**VODAFONE CAMPUS, DUSSELDORF**

Because of the 2009 financial crisis, several implementation scenarios were developed before the start of construction. Despite these difficult circumstances, **Jörg Ewald-Lincke** (Partner, Dusseldorf) safely guided the innovative campus project for almost 5,000 employees over the finish line.



2012

**OLD AND NEW
COMMERZBANK TOWERS**

With the help of a range of Drees & Sommer services, **Sascha Kilb** (Partner, Real Estate Consulting) supported the client, bringing the billion-euro project – comprising feasibility studies and refurbishment measures – to a successful conclusion.

**VIENNA UNIVERSITY OF ECONOMICS & BUSINESS**

The Vienna University of Economics and Business complex, which can accommodate up to 25,000 students, was completed on time and within budget thanks to the close collaboration of all project participants under the leadership of **Ralph Scheer** (Partner, Stuttgart).



2013

HEIDESTRASSE QUARTER

A new district is taking shape in the heart of Berlin – and **Simon Dietzfelbinger** (future Partner, Berlin) is the project manager responsible for this holistic urban development, featuring residential, leisure and work facilities.



2014

EUROPEAN CENTRAL BANK

Three Drees & Sommer Partners worked on this major project with enormous commitment:

Sascha Hempel (Partner, Project Management) supported the client all the way from the competition to the move-in. **Thomas Hofbauer** (Partner, Integrated Planning and Consulting) established the first requirements specification for complex projects, and **Jürgen Brandstetter** (Partner, Construction Management) successfully managed the construction site with his team.

**LONDON UNDERGROUND**

London Underground commissioned **Patrick Theis** (Partner, Innovation) and his process consulting team to ensure that Londoners are not restricted in their mobility during upgrade work. They used Lean Construction Management to organize reconstruction and modernization work.



BUILDING 1, F. HOFFMANN-LA ROCHE, BASEL
Veit Thurm (Partner, Integrated Design) and
Prof. Jürgen M. Volm (Partner, Switzerland) were responsible for the largest and tallest GCM project undertaken by Drees & Sommer to date. Since its commissioning in 2015, nearly all levels have been remodeled – which presented no problem thanks to the modular planning approach.



2015

50HERTZ NETZQUARTIER BERLIN
 For over four years, **Markus Weigold** (Partner, Berlin) supported the transmission grid operator 50Hertz on the way to completion of its future-proof headquarters. The building sets new standards in terms of sustainability, employee focus and failsafe operation.



**ELBE PHILHARMONIC HALL,
 HAMBURG**

Working in harmony with the city of Hamburg to implement innovations in acoustics and facades,

Prof. Phillip W. Goltermann (Partner, Hamburg) and his team undertook a rescue mission to ensure the successful completion of this complex and unique concert hall.



2016

FIRE STATION 4, MUNICH

Thanks to his high level of involvement, **Dr. Thomas Harlfinger** (Partner, Munich) led the project to timely completion within budget, preparing the way for further projects with the Bavarian state capital. This central command and control center handles all emergency calls from the region.



BAYWA MUNICH

The challenge in this project was to develop an architectural language based on the brand to reflect BayWa's fundamental values.

Daniel Seibert (Partner, User Experience) developed an impressive spatial concept based on the notion 'emotion meets function' – an achievement that was recognized with the iF Design Award.



2017

UNICREDIT

Cost optimization, sourcing and outsourcing of German portfolio operations, organizational and process consulting – **Thomas Häusser** (Partner, Real Estate Consulting) has supported UniCredit in all of these areas over recent years.



FREIBURG CITY HALL

Thanks to an energy concept developed by **Professor Dr. Michael Bauer** (Partner, Engineering), Freiburg's innovative city hall lays claim to being Europe's largest EnergyPlus building, as evidenced by the DGNB Climate Positive Label and the German Sustainability Award.



RAG ADMINISTRATION BUILDING, ESSEN

Working with the architects, **Dr. Peter Möhle** (Partner, Innovation and Cradle to Cradle) developed a building as a power plant and raw material repository featuring renewable energy supply, low tech, and recyclability.



EXPERIMENTA HEILBRONN

Germany's largest science center is a resounding success thanks to comprehensive Building Performance competence provided by Drees & Sommer. With his team, **Mirco Beutelspacher** (Partner, Stuttgart) used the General Construction Management approach to execution to realize a pioneering building.



2018

LEONBERG CABLE CAR

Claus Bürkle (Partner, Smart Infrastructure) prepared a cable car feasibility study for the city of Leonberg, triggering an intensive and interesting public debate. He is a valued mobility expert for many public-sector customers.



2019

TURMCENTER FRANKFURT

From a concrete skeleton to a showcase Green Building: Rising up from the Eschersheimer Landstrasse in Frankfurt, the Tower Center Frankfurt was fine-tuned by **Norbert Otten** (Partner, Integrated Design) for sustainability and energy efficiency using an innovative technical concept.

**DREES & SOMMER INNOVATION HUB**

The Drees & Sommer Innovation Hub in Stuttgart offers space for a wide range of uses. **Martin Becker** (Partner, User Experience) and his team created an innovative work environment – with sustainable conversion eliminating the need for a new building.

**THE SHIP**

Klaus Dederichs (Partner, ICT Industry) took a different approach to work environments and digitization with the client FOND OF: 'The Ship' is a Customized Smart Building intended to attract startups and establish Cologne as a hub.



2020

ROTTERDAM MAIN POST OFFICE

Rotterdam's former main post office building has been given a new lease of life – with shopping, a hotel, and apartments. The Dutch team led by **Michel de Haan** (Partner, Amsterdam) managed the inner-city project, which also includes a 150-meter residential tower above the main post office hall.

**OWP12, STUTTGART**

At its headquarters in Stuttgart-Vaihingen, Drees & Sommer is realizing an administration building that ticks all the boxes with regard to environmental friendliness and digitization. **Steffen Szeidl** (Partner and Member of the Executive Board) and the project team are ensuring that employees can move in by the end of 2021.

**WINX FRANKFURT**

Klaus Hirt (Partner, Real Estate Consulting) supported the project for the development of a family-owned office tower from acquisition TDD and FM invitation to tender through to commissioning.



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