



GERMAN  
DATACENTER  
CONFERENCE

24

2023

DATACENTER  
**OUTLOOK**  
GERMANY

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**ENERGY EFFICIENCY AND SUSTAINABLE OPERATIONS ARE IN THE INTEREST OF THE INDUSTRY, BUT CANNOT BE AT THE EXPENSE OF THE DIGITAL LOCATION.**

Over the past twelve months, regulations that explicitly focus on data centers have emerged at the federal and EU policy levels. Once again, it has become clear how important it is to not only raise awareness of special features of the “business model”, but also of the major social impact of the industry and the many synergies that arise when the location of new data centers is considered holistically. At least as important is the exchange on a professional level – on how we can jointly manage to make the data center industry sustainable.

## **SHAPING THE DIGITAL FUTURE TOGETHER**

For this year’s German Datacenter Conference, we were once again able to attract a large number of industry experts who will enable an interdisciplinary exchange of ideas on a professional level. In addition, we will host representatives of local politics, the federal government and the European Commission for a policy level exchange. With a broad spectrum of keynotes and panel discussions, we will thus offer you high-quality impulses on technologies,

strategies, investments and regulations in the data center industry.

The great response to the premiere of the German Datacenter Conference has prompted us to move this year’s conference to Bad Vilbel: At the gates of the data center hotspot Frankfurt, the freshly modernized conference center offers a suitable stage for professional exchange and networking with renowned experts and new faces of the German and European data center ecosystem.

Like the conference, this Datacenter Outlook Germany 23 / 24 is dedicated to the state-of-the-art and an outlook on the developments of the data center landscape in Germany. Further expert contributions discuss current regulatory challenges, the urban planning aspects of data center siting, and waste heat utilization from a technological perspective. Quotes from conference speakers shed light on the many facets of the ecosystem.

**ENJOY READING DATACENTER OUTLOOK GERMANY AND WELCOME TO THE GERMAN DATACENTER CONFERENCE 2023!**

# EVENT PARTNERS

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# GERMAN DATA CENTER MARKET

OUTLOOK 23 / 24

## HOT TOPICS



ESG



METRO EXPANSION



REGULATION



INTEREST RATES

## DATA CENTER'S JOURNEY TO HIGHER ENVIRONMENTAL, SUSTAINABILITY AND GOVERNANCE (ESG) STANDARDS

The ESG debate is here to stay! Investors are becoming more conscious of putting money into products that meet ESG criteria. This will affect every stakeholder in the industry:

- Corporate data center occupiers are reviewing the data center portfolio and need to decide whether on-prem DCs meet the requirements for sustainable operations.
- Colocation operators will need to meet sustainability expectations not only in operations, but also in design.
- Real estate investors will take a closer look at funding DC developments from an ESG point of view.
- Contractors and suppliers will be challenged to improve on already high levels of efficiency and PuE (power usage efficiency).

## MORE REGIONS

Look out for new regions! Berlin and Frankfurt are growing fast, but it is only a matter of time before the first hyperscale deployment is announced outside these two markets. Low vacancy rates in colocation DCs in

Frankfurt will widen the search radius for smaller tenant requirements. Metro areas such as Munich and Düsseldorf could be an alternative for occupiers who can no longer find colocation capacity in Frankfurt.

## REGULATION

While the masterplan and data center guidelines in Frankfurt have a regional impact, national legislation will change the way we build and operate DCs across the country. The reuse of waste heat will obviously have a major impact on development costs

but may also open new doors to obtaining planning permission from local authorities. The expectation of a new low to zero carbon heat source will raise the profile of data centers in urban planning and modern city development.

## INTEREST RATES

The new financial environment in which we find ourselves since last year has changed the real estate market significantly: Rising construction and capital costs have slowed down new commercial and residential

real estate developments. The opportunity for the data center industry is now to expand in locations that would normally be dominated by office or retail developments.



# THE GERMAN DATA CENTER REAL ESTATE MARKET IN A NUTSHELL

## SUPPLY

901

MW (+23.6% y-o-y / 171MW)

## TAKE-UP

179

MW (+26.9% y-o-y)

## VACANCY

7.9

% (-2.3% y-o-y)

## AVAILABILITY

71.2

MW (+6.3% y-o-y)

Despite all the turmoil in the capital markets and the economy in recent months, data centers remain a strong asset class:

- Germany is the second largest market for colocation capacity in Europe, surpassed only by the UK. While this is unlikely to change in the short term, it is debatable whether and when Germany will have more capacity.
- Land prices for new DC developments are again at record high levels. This applies to both Frankfurt and Berlin.
- Vacancy rates are at an all-time low across Germany. As the development of

new capacity can rarely keep pace with demand, this trend is set to continue.

- The low level of available data center capacity is pushing up rental levels.

There is no evidence in the market that the growth in new capacity will slow down. However, the market for built prime data centers with long-term leases is low. The shortage of these prime investments is not actually a new development, but rather a lack of interest from DC owners/operators to sell their assets.



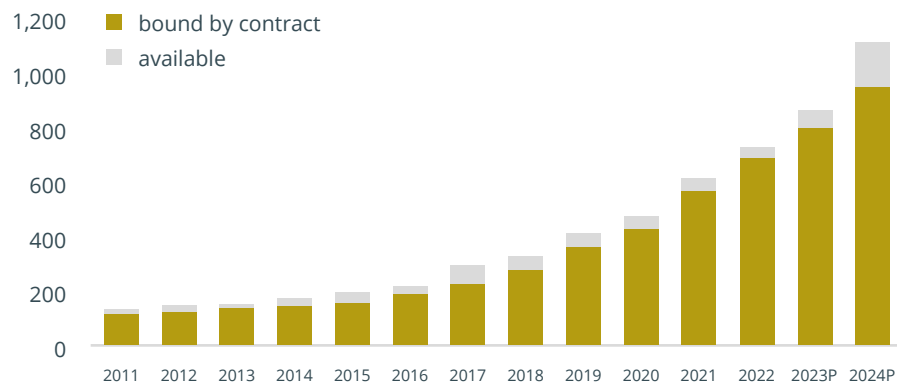
## FRANKFURT

There is never a dull moment when it comes to data centers in and around Frankfurt. While new local regulations limit new developments in the city, more and more municipalities in the wider region are seeing the benefits of data centers. The latest developments in Frankfurt are flagship projects for the industry, introducing efficient ways of distributing waste heat and testing new architectural elements, including green facades and an attractive design that goes beyond functionality.

## OUTLOOK

The overall outlook for Frankfurt remains very positive. As expected, the reach radius is rapidly expanding beyond the city limits of Frankfurt (watch out for Mainz!). The recent openings of new DCs will include many operators new to Frankfurt, diversifying the supply side of the market.

### DEVELOPMENT OF THE DATA CENTER MARKET IN FRANKFURT BY MEGAWATT (MW)



## BERLIN

Germany's second largest market is now an established Tier 2 market in the European context, ahead of Warsaw, Stockholm, Zurich and Vienna. This is again largely due to hyperscale deployments by cloud operators, but retail colocation DCs are also building new capacity for customers. Following the general trend in the German market, vacancy rates are falling and rental levels are rising.

## OUTLOOK

As in Frankfurt, the geographical distribution of data centers in Berlin is becoming more diversified: while most activity has been concentrated in the south of Berlin, new site acquisitions are now also visible in the north-west of Berlin. As this is also driven by the lack of power supply, new areas of Berlin will come into focus as soon as the power supply becomes more limited.



**MICHAEL DADA** is Head of CBRE'S Advisory & Transaction Data Center Solutions team. He and his team see the benefits of ESG standards less as a challenge but more as a key driver for growth across the DC industry.



## EXPERT INSIGHTS

# ARE THERE ANY DEVELOPMENTS WHICH ARE INHIBITING GROWTH TODAY? WHICH INNOVATIONS OR SOLUTIONS ADAPT TO SOLVE THAT PROBLEM?



Data centers are now in the public eye more than ever. Energy consumption is a topic that is now discussed by politicians and the general population alike. Operators need to address these issues to maintain a favourable policy landscape and maintain the data centre industry as an attractive sector, not only for investors but also employees. Operators need to find solutions to topics like heat recovery in order to add value to their operation.

DR. DIRK TUREK | Senior Analyst  
CBRE



A main concern for many of our clients is the new law on energy efficiency (EnEfG), which when passed will require data centers to deliver a minimum amount of waste heat to be re-used. Based on the very high energy density of data centers, available heat-sinks are often too small to deliver the %-rates required by EnEfG. Exceptions stipulated in the EnEfG to handle such cases are not entirely clear and create concern among our clients.

ALEXANDER HAUSER | Managing Director  
TTSP HWP

The new energy efficiency law (EnEfG) has created an ongoing discussion, with many details not making it easier to build and operate data centers in Germany. Reusing the waste heat will be mandatory and concepts for that need to be developed together with the municipalities and district heating providers. The aim of the GDA is to help the industry and the politics to have a common understanding and increase the speed of digitization in Germany.

CHRISTIAN KALLENBACH | Head of Sales & Marketing  
NDC-GARBE



Data center design and architecture should be more flexible to adapt to the urban environment. Space efficiency should also be increased to squeeze as much as possible out of scarce land. Improving cooling (less noise) and backup power (no pollution and less noise) can help to reduce reservations about building new data centers.

MICHAEL DADA | Head of Data Centre Solutions Germany, Advisory & Transaction – CBRE GmbH



Our industry is increasing under the scrutiny of regulators. As significant consumers of electricity, we find ourselves captured by a range of incoming regulations – from the German Act to Increase Energy Efficiency (EnEfG) to the EU's Energy Efficiency Directive and the CSRD. We firmly believe that our sector can simultaneously contribute to the twin goals of a digital society and a sustainable society.

AMY DANIELL | SVP, Strategy & Development  
STACK Infrastructure



One aspect that needs to be clarified is for sure the heat reuse as energy source. There is no clear business model. It is needed to get all the value chains together, defining roles and responsibilities: energy companies/utilities, datacenter companies, city planners, governments and authorities, municipalities. This way datacenters will become key energy sources for more efficient and sustainable cities.

ROLF JÖNSSON | Datacenter HVAC Business Developer  
Alfa Laval MidEurope



# REGULATIONS

## HOW TO ACHIEVE SIGNIFICANT GROWTH UNDER TOUGHER CONDITIONS?

The data center industry is experiencing a continuously high demand, from both, Hyperscalers (such as Google, AWS, Microsoft, etc.) as well as enterprise customers, for capacities in the coming years. The growth is without alternatives since Germany is only number 27 in the world (no. 11 out of 27 EU countries) when it comes to digitalization.

Data center capacity is the base for all the data created by hundreds of new applications for almost every part of work and life. Therefore the potential is huge. However, strengthening regulations in Germany are bearing the risk of shifting focus to other European countries for further expansion.

## PROPERTY AND POWER – THE IMPOSSIBLE SEARCH?

We are facing increasing hurdles in developing new projects due to the scarcities of land, renewable power and grid capacities in the top tier regions. As a consequence, our timely horizon is expanding to a medium to long term planning focus of future capacities. In some cases, waiting for power availability is already exceeding 10 years, fostering alternative energy solutions in micro grids. Securing capacities and the ability to build new data centers is now the key! Working together with municipalities, providing transparency to our market, will help educate municipal decision takers. The chance to attract new, future-oriented businesses and to position themselves as forward-thinking, with creative digital

concepts, will trigger their interest in data center allocations and willingness to provide the necessary land. Low latencies are still required for business critical applications and a local data center will ensure the highest and fastest availability. The German Datacenter Association is playing an important role in enabling the relationships between our data center industry and governments, at all different levels. After years of growing formats with up to 3-digit MW capacities, the above constraints might as well lead the market towards smaller edge deployments. Numerous concepts for decentralized and integrated urban locations, including smaller data centers, are in the making, yet still lacking the operators.

## ENEFG – CHALLENGE OR OPPORTUNITY?

The upcoming Energy Efficiency Act (EnEfG) will challenge all players in the industry. With the mandatory waste heat reuse all data centers will need to be ready to provide excess heat to external off-takers. Municipalities and district heating providers are seen as major consumers of this waste-heat. Few providers are exercising or planning heat-re-use concepts, while all operators have identical decarbonization targets to reach. Given a seamless cooperation of all stakeholders, successful heat re-use cases are possible, but the feasibility of the given quotas are strongly doubted. However,

we see the first projects being implemented in metropolitan areas, where a district heating is in place. At the same time, the fairly old, high-caloric district heating grids in Germany have a limited interest to connect to datacenters with low-caloric excess heat. Last but not least, data center operators fear the EnEfG's setting of 1,2 as a PUE target. This is relevant to all data centers going live after July 1st, 2026, including many projects currently undergoing the final planning stage. These will need to be redesigned or changed, in order to comply to the EnEfG.

## HPC & AI – MASSIVE CAPACITIES NEEDED?

With the most recent trends on the application side, there is an enormously increasing capacity demand developing. HPC as a high density, power hungry application is now used in many different industries and enterprises. Since almost a decade we are seeing some of the capacity moving to the Nordic countries, but there is a strong trend

to also build up more HPC capacities in Germany again. The other growing trend with high demand is AI. Many AI applications require the highest grade of security and data sovereignty. To reduce the risk and increase the comfort level, companies are planning to install their capacities in Germany.

## POWER GENERATION – IS THE GERMAN ENERGY MIX SET IN STONE?

By the end of the nuclear era in Germany, the energy mix became more carbon-heavy. Lacking hydro power and sufficient renewable power capacities in general, power from wind and solar are neither weather independent nor efficiently storable in

scale, yet. As such, 100% renewable power coverage for business and private consumers in this country. Despite these facts, the EnEfG demands 50% renewable energy use by January 1st, 2024 and 100% renewable energy use by January 1st, 2027.



An openness for new technologies and ways of power generation is key for innovative developers and data center operators. Several companies are currently developing new concepts for both, power generation and back up solutions. Amongst them,

fuel cell technology running on hydrogen is one of the most discussed alternatives, these days. Concepts are under development in the data center industry and in close partnership with the energy providers NDC-GARBE is at the forefront of these.

## LIQUID COOLING – WILL THAT HELP SIGNIFICANTLY?

For almost a decade, liquid cooling solutions have been discussed intensely in many different ways. Implementing direct chip cooling or immersion cooling could help to reduce the temperatures in data centers, hence lessen building heights and construction costs. Besides the higher temperature of waste heat from direct cooling, liquid cooling increases the efficiency of the heat transfer to the district heating, since losses through the extraction of ener-

gy from liquid media are much lower than from air.

Although the technology is fully developed, liquid cooling is awaiting general acceptance from cloud providers and hyperscalers to become “state of the art”. Taking the recent developments and political target settings into account – we expect this to come rather sooner than later.

## FUTURE PREDICTIONS FOR 2024 AND BEYOND

Despite the constraints described, it seems unlikely that Germany will lose its global role or attractive environment. Hyperscalers’ priorities might shift to other European countries with less regulation and available resources. This could dampen the pace of German digitalization. More likely we expect the local economy to stay a key demand driver and reliable generator of data. Accelerated by the need for virtualization, automation, communication, HPC as well as AI, embedded in the most secure constitutions the demand for capacities will continue to drive market growth. There are

further data center projects under development with hundreds of MW’s in the most sought-after German cities of Frankfurt and Berlin. These are mainly developed for or by Hyperscalers. In addition to that, Tier 2 locations, such as Duesseldorf, Hamburg, Nuremberg and Munich, are seeing additional new projects, mainly from enterprise users and colocation providers. All of these future capacities will add to the gravity of existing data centers.

## THESE ARE THE TOP RECOMMENDATIONS AND PRIORITIES, TO SUCCESSFULLY DELIVER NEW CAPACITIES AND TO SUPPLY THE GROWING DEMAND

- 1 Think medium and long term for property and power availability
- 2 Sustainability by design
- 3 Lean construction and design
- 4 Tailored design towards the end user needs
- 5 Waste heat reuse is mandatory
- 6 The EnEg is setting the new standards & boundaries for Germany
- 7 Edge deployments will increase

The German data center market is expecting significant growth in the upcoming years. The entire industry will contribute with innovative solutions and forward thinking concepts.



CHRISTIAN KALLENBACH is Head of Sales & Marketing at NDC-GARBE. The German data center developer is on a mission to decarbonize digitalization. They provide end-to-end data center development services and partner with their clients throughout the entire development cycle.



## EXPERT INSIGHTS WHAT NEW DEVELOPMENTS/ INITIATIVES WILL BE RELEVANT TO YOUR COMPANY IN 2024?



We are focusing on supporting our partners with data center physical infrastructure solutions optimized on learning AI and inference AI. These include innovative ways to power, cool manage and service higher density racks, POD's and clusters. We continue to partner with customers on their sustainability journey no matter where they are on their journey.

VINCENT BARRO | VP Secure Power DACH  
Schneider Electric



Not least due to legal necessities, innovations in technical development, building construction, modular planning and project type (greenfield vs. brownfield) are among the topics that we as an overall planning team are driving forward in our projects. With each new project, we critically question established structures and standards. Our aim is to continuously improve and promote them.

MATHIAS FRANKE | Manager  
Drees & Sommer SE

Government has announced to support serial and modular construction in the future. According to this, we expect the approval process to become simpler and faster in the near future. The increasing decentralization ( growth of co-location data centers, possibility of flexible usage, later extension of existing infrastructure) of data centers brings enormous growth potential for the modular construction industry.

BJÖRN OELLRICH | CEO  
ADK Modulraum



Getting ready for heat reuse becomes default and support new legislation, and ramping up to support the shift towards a hybrid cooling concept with air- and liquid cooling. New developments are focused on preparing for the implications of these trends (e.g. modularity, increases temperatures, ease of use and commission, environmental product declarations).

JAKOB JUL JENSEN | Head of Data Center Vertical  
Danfoss



The datacenter industry is experiencing increasing regulations from local, regional, federal and EU governments (Masterplan FFM, EnEFG, CSRD, etc.) The Corporate Sustainability Reporting Directive, becoming effective in 2024, will be the next step for our datacenter clients to focus, measure and comply with ESG standards. The need for higher transparency and the requirement to build and operate more sustainably and more effectively is tailwind to NDC-GARBE on their mission to decarbonise digitisation.

PETER POHLSCHRÖDER | Managing Director  
NDC-GARBE



The demand for more and more processing power, the topic of quantum computing, but also new, technical concepts for complying with sustainability requirements by the government or the request for significantly more sustainability by the end consumers.

TILL RUDA | Director Infrastructurefunds  
Record Asset Management GmbH



# URBAN PLANNING

## ARE NEW DATA CENTER BUILDINGS COMPATIBLE WITH SUSTAINABLE AND AMBITIOUS URBAN DEVELOPMENT?

Largely under the radar until a few years ago, data centers are increasingly becoming the focus of municipalities, urban planners and society. Instead of being skeptical about data centers, an open discussion of urban design requirements with operators and planners is a better way to make a multi-use project a reality.

Gone are the days when architects used the good old black and white plan to show scale, granularity, architectural aspects and the way buildings fit into their environment.

Photorealistic images that incorporate the surroundings have long been used to visualize planned buildings to assist decision-making and opinion-forming of the various stakeholders. When the approval of such buildings is discussed by senior local authority planning staff, these renderings provide a good representation of the later reality. Nevertheless, logistics and industrial warehouses are often wrongly used as an urban comparison, because of their number, size and lack of architectural sophistication.

## UNIQUE URBAN PLANNING ASPECTS

For future data centers, it looks quite different. On the one hand, the sheer size of logistics warehouses is not reached by data centers, and on the other hand, their sites are completely different as regards their design. For data centers, the traffic and service area is of minor importance, so that - in contrast to logistics - a relatively high proportion remains unsealed and is designed to a high standard. Thus, they are able to contribute to sustainable so called "sponge cities", to avoid heat-island effects and to

consider bio-diverse planting. Last but not least, data centers are also capable of setting positive urban design accents.

Basically, data centers (or a data center campus) have two different areas of use: the actual data halls, i.e., the buildings housing computers and their associated technical infrastructure, and office and service areas. The latter also have different requirements and enable different approaches to facades.

## FACADE DESIGN OPTIONS

Especially the facades of the office and service areas offer almost unlimited design possibilities: classic with glass elements for window facades, single or multi-skin, or mullion and transom constructions made

of metal, natural stone, ceramics or wood, and many other superimposed textures such as textiles.

For the data halls, for example, metal clad-





ding, translucent expanded metal facades, but also textile elements allow the design of large-scale facades to be adapted to the scale of the surroundings.

In addition, due to the high specific total costs of a data center including the tech-

nical infrastructure, the cost of the facade is less relevant, which is not the case with warehouses. In this respect, the need to build cost-efficiently which often underplays the design is true only to a very limited extent in the case of data center facades.

## FACADE GREENING AND SOLAR POWER GENERATION

Increasingly important is also the establishment of green facades: This can be done by putting plants in the ground to partially climb up the facade and which can be seen from a distance, or by deploying planters or cushions integrated into the facade. Even facades higher than 25 meters can be greened in this way and bring with them advantages of oxygenation, dust binding, local cooling and biodiversity promotion. It is important to keep these green elements watered throughout the year which can be done with the help of collected rainwater. Choosing evergreen plants can ensure a minimum of vegetation even in winter.

For sustainability criteria, the use of solar energy through photovoltaics is often demanded in facade design. However, because data center rooftops are typically covered by cooling and ventilation infrastructure, they are poorly suited to the placement of solar panels. Thus, self-generated electricity can often be obtained only from the facades.

In energy terms, the electricity contribution from electricity photovoltaics - in relation

to the total energy consumption of a data center - may be small, but many municipalities understand that every MWh that is produced locally naturally improves the CO2 balance.

When considering rising outside air temperatures, a light color scheme for the building shell is increasingly required; this reduces the sun's heating effect on the outer skin and the thus radiation of heat from the facade; at the same time, low-reflective materials are used.

The current trend to use facades made of renewable and recycled materials will also certainly continue if the calculation of the CO2 balance takes into account not only the operation but also the construction of data centers.

The formulations by the approval bodies of urban integration and specific design quality requirements can also be achieved by data center developers without significant economic disadvantage.

## WASTE HEAT UTILIZATION AND MUNICIPAL HEATING PLANNING

The city of Frankfurt am Main has designated clusters in its Commercial Land Use Development Program (the Gewerbe-flächenentwicklungsprogramm) where data centers are to be located. Since available land is limited, data centers are now being directed to the municipalities surrounding Frankfurt. Data centers, with their very low traffic volumes and low local emissions, are ideally suited to enhancing and supplementing commercial and industrial areas.

So far, almost unnoticed, a new urban development aspect is emerging: The waste heat from data centers, which is available all year round, can be used in the future by cities and municipalities to heat houses and businesses. This can be an essential building block in the development of heat plans that municipalities are required to draw up, showing how by 2045 they can achieve 65% non-fossil energy sources in their attempts to decarbonize.

## HOLISTIC APPROACH REVEALS POTENTIALS

The choice of data center locations in the future will in part depend on the proximity of district heating networks, and on their distance from other usable heat sinks. Cities that recognize such opportunities will be able to attract parts of the data center mar-

ket by the provision of such opportunities. This will enable them to make a contribution to the quality of urban space by taking into account the aspects mentioned above in the development of their urban development plans.



ALEXANDER HAUSER is Managing Partner at TTSP HWP. The Frankfurt-based consulting firm specializes in the planning of data centers, has always been concerned with the holistic urban integration and high design demands of data centers, without compromising on functionality in any way. Smart concepts make this predominantly successful.





## EXPERT INSIGHTS WHICH TRENDS DO YOU EXPECT TO SEE HAPPENING IN 2024 AND ARE RELEVANT FOR YOUR ORGANIZATION?



Every day, people and machines generate more and more data that needs to be stored and processed somewhere. However, fewer companies want to maintain their own data centers and are outsourcing their IT to colocation data centers or relying entirely on cloud services whose operators also use data centers. In addition, demand for colocation services continues to grow, with the massive advances in AI development, for example, providing an additional boost to data center space growth in 2024.

**KONSTANTIN HARTMANN** | Vice President Sales & Commercial  
NTT Global Data Centers EMEA



Talent remains key to success and will become even more important. We as an industry will be forced to shed our narrow-mindedness and to challenge our hiring flexibility in a positive manner as there is not enough possible talent available in time.

**TIM IFFARTH** | Talent Acquisition Partner Europe  
CBRE GWS IFM Industrie GmbH



On the cabling infrastructure side innovations are driven by high fiber count/high density applications such as ribbon fiber. The trend to answer sustainability requirements in avoidance of “greenwashing” is more and more dominant and affects supply chains and the suppliers significantly.

**MATTHIAS REIDANS** | Senior Project Manager  
Rosenberger OSI

The trend is moving towards more sites on the metro of core markets extending from the traditional FLAP-D, due to the scarcity of land & power. Green power and green initiatives will influence the choice of location and stretch the distances. Changing Customer workloads could change the requirement for data centre provision – as for example, increased density and bare-metal requirements. Next generation AI requirements will change the way of building and delivering data centres across EMEA.

**CHRISTINA MERTENS** | Vice President of Business Development,  
EMEA – VIRTUS Data Centres



Exponential growth driven by AI, IOT and demand in cloud services. Edge computing is fast increasing. Higher power density per rack finally becomes a reality. Large demand for more management tools in all areas such as monitoring, self-healing technologies (AI) and predictive maintenance.

**ANDREAS ROCKENBAUCH** | Snr Key Account Manager EMEA  
Datacenter – Eaton Electric GmbH



Efficiency has always been an important factor in data center design, and whilst the industry has made great strides in improving the effectiveness of facilities there is always more that can be done. The next step is to work with clients, and consumers, to improve the productivity of the core workloads we host.

**ADAM TAMBURINI** | Chief Hyperscale Officer  
STACK Infrastructure



Today, the majority of day-to-day business and consumer activity is supported by data centres in some way and this is expected to continue with the development of Artificial Intelligence (AI). This means we've seen increased customer demand for our data centre products, with a similar focus on strategic locations, connectivity and power to our industrial property activity.

**DIRK MÖLTER** | Sustainability and Technical Director CE  
Goodman Germany GmbH



# TECHNOLOGY

## HOW WASTE HEAT UTILIZATION IS HELPING TO CREATE CARBON-NEUTRAL DATA CENTERS

Data center operators have to bear many different factors in mind. One of the most important is the issue of energy efficiency, with operators choosing highly energy-efficient air-conditioning solutions. Germany's planned Energy Efficiency Act has catapulted the topic of heat recovery to the top of the agenda for data center operators. In addition, the local influence of legislators and society is having an ever-greater impact on a global scale.

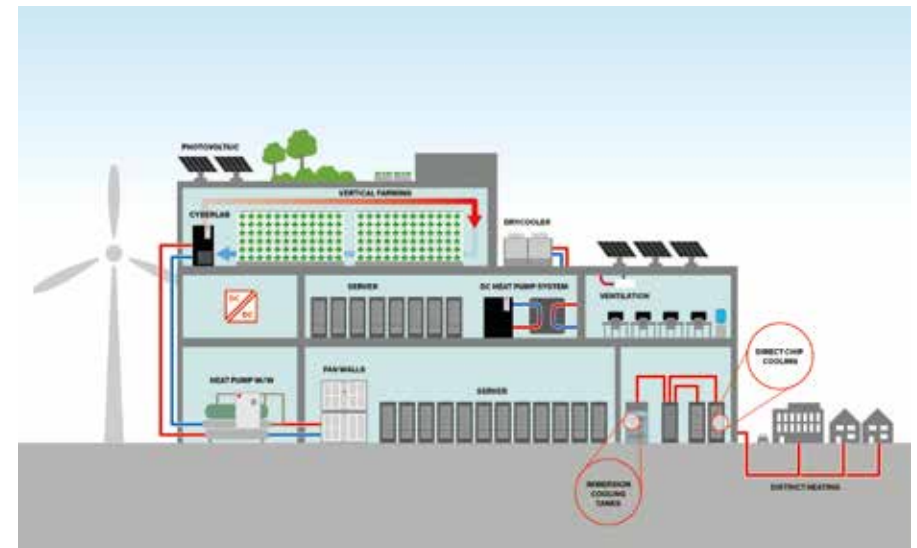
In both new and existing data centers alike, these factors have to be identified early on and taken into account. It is also very important that the proposed cooling solutions are modified to meet local requirements, in order to meet sustainability standards in every region.

One of the aforementioned global factors is the recovery of heat produced in data centers. This is a very significant issue for everyone who operates in a data center environment, as responsible authorities and societies in almost every region wonder what should be done with the valuable waste heat that they generate.

As soon as usable waste heat potential in data centers is identified, operators have to find an easy way to make it available

on demand. Legislators must also create reasonable solutions to enable the use of waste heat for third parties. If necessary, the infrastructure required for this must be promoted and a legal framework created to build it in the first place. Only then will it be possible to use waste heat from data centers to replace fossil fuels in other areas. It is virtually impossible for the waste heat generated in a data center to be simply transferred in the form of warm air to another user, such as a property, decentralized heat generation or a vertical farm. This is far too costly and the waste heat is simply not warm enough to be economically viable. In addition, data centers are highly complex facilities that are self-contained and must meet very high safety standards. Implementing structural measures is therefore not so easy. In order to successfully use waste heat in this environment, it is important that the existing air-conditioning systems in a data center are included in the planning, in order to generate the required temperature for other users. An additional ready-for-connection module can be connected with the air-conditioning system to use the waste heat from data centers.

The system enables data center operators to use the heat generated by their servers



Heat recovery opens up opportunities for data centers to find new customers for energy reuse. These include vertical farming, hotels, swimming pools and office buildings.

in a quick and straightforward way. It can be integrated directly into a heating network without the need for an additional heat pump. The system also uses a low-GWP refrigerant, so data center operators can rest assured they will be getting a sustainable air-conditioning solution that has a low-cost factor and a very low carbon footprint.

It is also essential to take into account the significant proportion of energy consump-

tion in a data center made up by air-conditioning. This can be between 20 and 40 percent of the overall energy consumption, depending on the ambient temperature and the degree of modernization required. With the right solutions, air-conditioning is therefore the area where the biggest improvements can be made in terms of cost savings, energy efficiency and carbon footprint.

## HOW DOES THE STULZ DC HEAT PUMP SYSTEM WORK?

When developing the DC heat pump system, it was necessary to take a holistic approach to heat recovery and consider various needs. These included scalability and a low space requirement.

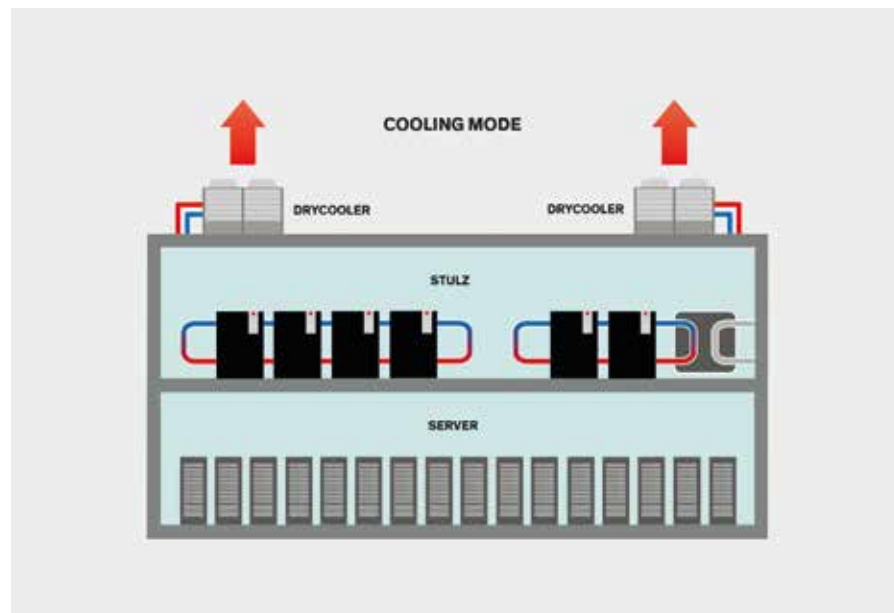
The system can also be installed in existing data centers. Space is always a limiting factor: it is not easy to enlarge an existing data center when it is surrounded by other buildings. The heat recovery system is therefore compact and scalable. In addition, the data center operator is not forced to immediately convert the entire system to

heat recovery. Instead, they can convert the data center step by step as the number of external heat consumers grows.

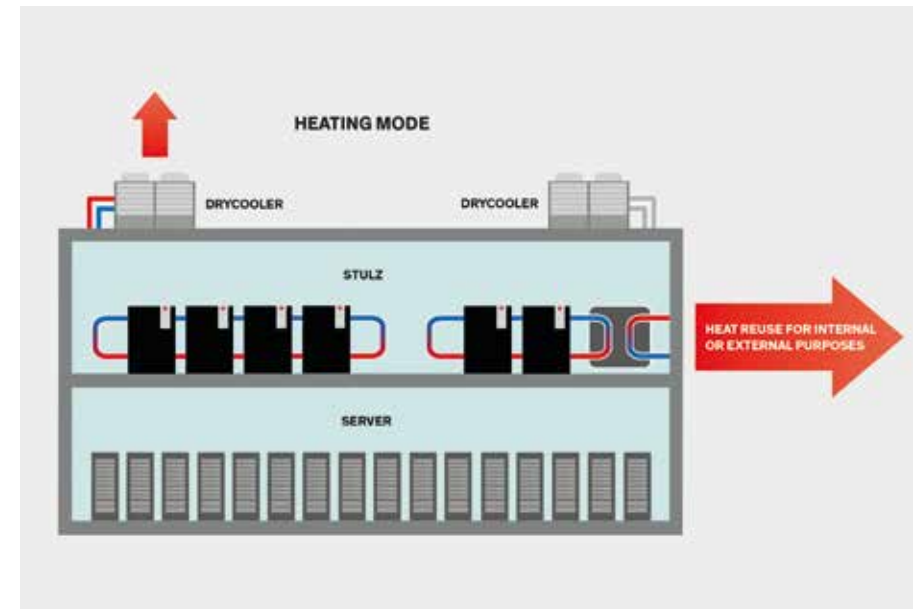
The operating modes of the units are controlled based on the current heat load in the data center and the outside temperature. An intelligent hydraulic control system supports the operation of the DC heat pump. To enable heating (heat emitted externally), the air conditioners installed in the data center, together with the DC heat pump system, must bring the return air from the data center to a temperature that can be used

externally. A mixing valve is used to keep the water temperature at a suitable level so that the compressors can heat up the water quickly and efficiently. This combination can generate a water outlet temperature of up to 65°C, which is suitable for many external consumers.

The heat recovery module can be installed together with the indoor units in the data center, or decentralized in a separate supply tract or outside the building. The system is available with the low-GWP refrigerant R513A. It is suitable for a wide range of installation scenarios in both new and existing data centers.



The DC heat pump system is integrated as a module into the existing cooling system with indirect free cooling. When there is no heating demand, the system is bypassed and heat is transferred through the dry cooler. In cooling-only mode, the system intelligently switches between mechanical cooling and free cooling.



If heating is required, the associated units will switch to heating mode. The DC heat pump system is no longer bypassed and heat is transferred via the system to an external consumer.



NORBERT WENK is Head of Product Management at Stulz. The Hamburg-based company is one of the world's leading specialist suppliers of air-conditioning systems for data centers and mission-critical applications. The product range focuses in particular on fail-safe operation, maximum efficiency and sustainability.



# CONTRIBUTORS

## CBRE

As the world's largest data center real estate practice, CBRE Data Center Solutions is able to provide the strategies, insights and end-to-end services needed to optimize data center solutions from inception through disposition.

[WWW.CBRE.DE/EN-GB/SERVICES/PROPERTY-TYPES/DATA-CENTRES](http://WWW.CBRE.DE/EN-GB/SERVICES/PROPERTY-TYPES/DATA-CENTRES)



TTSP HWP provides general planning services and implementation oversight to its international customers who are building integrated data centres. Founded in 1989, the Frankfurt-based consulting firm has im-

plemented more than 30 data center projects nationwide as a general planner.

[WWW.TTSP-HWP.DE](http://WWW.TTSP-HWP.DE)

## NDCGARBE.

NDC-GARBE is a German data center developer on a mission to decarbonize digitalization. The experts combine decades of experience in European real estate de-

velopments with a profound knowledge of data center market and technologies.

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With over 50 years of experience, STULZ is a leading pioneer in the field of cooling solutions for reliable applications and data centers.

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# ABOUT GDA

## GERMAN DATACENTER CONFERENCE

The German Datacenter Conference is an initiative of the German Datacenter Association. With the conference, we offer all stakeholders of the data center ecosystem

a platform to make contacts and exchange professional ideas with renowned experts and new faces of the German and European market.

## GERMAN DATACENTER ASSOCIATION

The German Datacenter Association (GDA) unites all players in the value chain of digital infrastructures throughout Germany: 125 companies in the data center ecosystem are among GDA's members, including the majority of operators and owners of data centers of all sizes. This network of expert companies promotes synergies across traditional industry boundaries.

Founded in Frankfurt am Main in 2018, the association offers data center operators in Germany a platform to jointly promote the industry's growth. Its declared goal is to sustainably improve framework conditions

for data center operations in Germany, the public's perception of the data center industry, and to enhance the appeal of German locations in the eyes of investors.

Members concentrate their know-how in six competence groups with a view to working together on the Association's key issues. The development of a strategy for sustainable digitalization and intensive dialog with representatives from politics, local authorities and the real estate industry are just as much a focus of the working groups as the promotion of young IT talent and a transparent communication with the public.

INTERESTED IN BECOMING A MEMBER OF GDA OR PARTNER OF THE GERMAN DATACENTER CONFERENCE 2024? CONTACT US VIA [OFFICE@GERMANDATACENTERS.COM](mailto:OFFICE@GERMANDATACENTERS.COM)

**ANNA KLAFT**  
Chairwoman  
[klaft@germandatacenters.com](mailto:klaft@germandatacenters.com)

**ROBIN HILLESHEIM**  
General Secretary  
[hillesheim@germandatacenters.com](mailto:hillesheim@germandatacenters.com)



**ALICIA ROSSBACH**  
Event & Project Manager  
[rossbach@germandatacenters.com](mailto:rossbach@germandatacenters.com)

# GDA YOUNG TALENT AWARD

## TALENTS SHARE THEIR SMART IDEAS

With the GDA Young Talent Award, the German Datacenter Association is explicitly looking for talents who want to contribute to the digitalization of tomorrow: Outstanding bachelor's, master's and diploma theses in data centers and digital infrastructures are each awarded 1,500 EUR or 2,500 EUR. After the successful premiere in 2022, Prof. Dr. Kristina Sinemus, Hessian Minister for Digital Strategy and Development, has agreed to be the patron again this year and to award the prizes on 19 September 2023.

Be there when outstanding young IT talents share their smart ideas for the future of data centers with us!



**GDA YOUNG TALENT  
AWARD CEREMONY**  
19 September, 7 pm

# OPEN DATA CENTER DAY

## NATIONWIDE AWARENESS CAMPAIGN

## ON THE TOPIC „WHERE DOES THE INTERNET ACTUALLY LIVE?“ – 29 SEPTEMBER 2023

To provide the public with a tangible answer to this question, GDA has gained 20 data center operators all over the nation to open their doors and offer tours during this day. 26 data centers in 14 cities will participate on 29 September.

It is the ideal opportunity to educate the direct neighbourhood, but also representatives of the municipalities & local politicians, citizens' initiatives and pupils about the great importance of data centers for modern



life and work. With this event, GDA aims to create more acceptance for our industry and understanding for the data center business model in broad sections of society.

# GDA EVENTS IN 2023

## SEPTEMBER

29.09.2023 **OPEN DATA CENTER DAY** (Tag der offenen Rechenzentren – TdoRZ)

## OCTOBER

02./03.10.2023 **GDA goes DCD>CONNECT** | London  
05.10.2023 **GDA NET[T]WORK LUNCH @ Rittal** | Frankfurt  
25.10.2023 **THINK TANK REAL ESTATE** | Frankfurt  
26.10.2023 **GDA NET[T]WORK LUNCH @ SGB-SMIT** | Regensburg

## NOVEMBER

15.11.2023 **Opening event in political Berlin** | Berlin  
29.11.2023 **GDA NET[T]WORK LUNCH @ NewTelco** | Karlstein am Main

# EVENTS IN 2024

## JANUARY

**GDA New Year's Reception**

## FEBRUARY

26/27.02.2024  
**GDA goes KICKSTART EUROPE**  
Amsterdam

## APRIL

**GDA General Assembly**

## MAY

22./23.05.2024  
**GDA goes DATA CENTRE WORLD**  
**FRANKFURT**  
Frankfurt

## JUNE

04./05.06.2024  
**GDA goes DATA CLOUD GLOBAL**  
Cannes

## JULY

**GDA Summer Party**

## AUGUST

**APPLICATION DEADLINE: GDA YOUNG  
TALENT AWARD**

## SEPTEMBER

**GERMAN DATACENTER CONFERENCE**  
**OPEN DATA CENTER DAY**

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German Datacenter Association e.V.  
Hanauer Landstraße 204  
60314 Frankfurt  
+49 69 8700-39283  
www.germandatacenters.com

## EDITOR-IN-CHIEF

Anna Klaft  
Founder German Datacenter Conference  
Chairwoman GDA  
klaft@germandatacenters.com

## CONTRIBUTIONS

German Datacenter Association  
(Julia Niederwipper)

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CBRE Data Center Solutions  
(Michael Dada)

TTSP HWP  
(Alexander Hauser)

NDC-GARBE Data Centers Europe  
(Christian Kallenbach)

STULZ  
(Norbert Wenk)

**DESIGN, GRAPHICS, LAYOUT**  
COAST DESIGN, www.coast-design.de

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