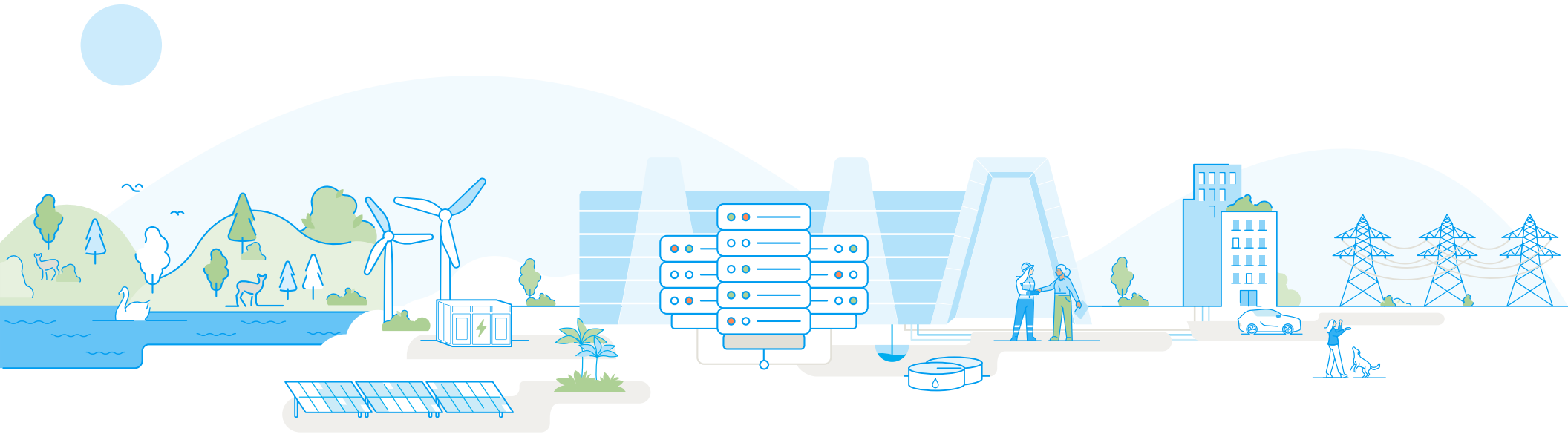
Transforming the future of data centers

Driving efficiency, sustainability, and innovation across the data center facility lifecycle

ramboll.com/datacenters

Ramboll offers global expertise in creating strategic solutions for data centers that support resilience, efficiency, and a circular economy, while delivering energy efficiency, climate benefits, and costs savings. Our multidisciplinary approach allows us to assist clients in achieving ambitious sustainability goals.



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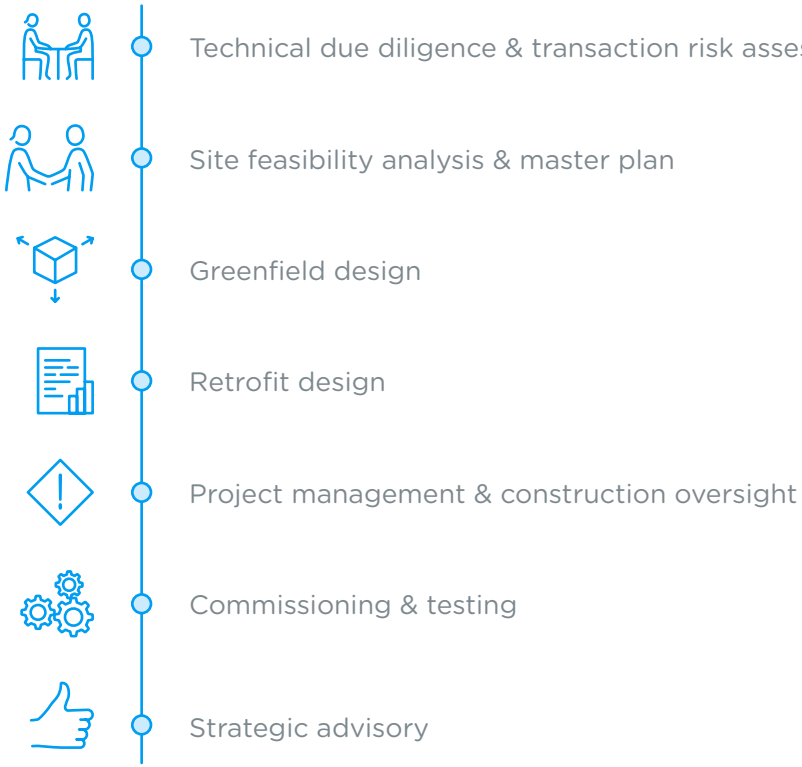
Our services



- Technical due diligence & transaction risk assessments
- Site feasibility analysis & master plan
- Greenfield design
- Retrofit design
- Project management & construction oversight
- Commissioning & testing
- Strategic advisory

$60Bn+
due diligence transactions

15+ GW of IT
of data center space designed and tested

1k+
data center studies completed

Top clients
experience with largest REIT, hyperscale, colocation, and investment firms

18,500
employees worldwide

01

Technical due diligence & transaction risk assessments

As digital transformation accelerates, the demand for resilient, scalable data centers continues to grow. Ramboll's Mission Critical Facilities team helps clients navigate complex data center transactions by ensuring that every data center colocation investment is not only technically sound but also strategically sustainable.

Ramboll's comprehensive approach to technical due diligence and transaction risk assessments ensures that every aspect of a data center acquisition is carefully evaluated. We assess key factors such as site feasibility, infrastructure integrity, operational efficiency, and long-term scalability. Our highly experienced global data center specialists can rapidly mobilize worldwide and bring deep sector experience, knowledge, speed, and efficiency to the process. With a deep understanding of the market, we provide valuable insights to guide successful transactions and support future growth.

Services

- Remote desktop assessment
- Comprehensive technical assessment
- Operational and maintenance review
- Risk and resilience evaluations

01.

TECHNICAL DUE DILIGENCE &
TRANSACTION RISK ASSESSMENTS

28 Data center due diligence technical assessments

Ramboll was selected to perform a technical due diligence review for 28 data center properties across the world as part of a private equity firm's acquisition process.

The scope included:

- Review of site and location risks (e.g., flood plains, seismic activity, natural disasters).
- Evaluation of critical systems, including UPS, HVAC, power distribution, cooling, and backup systems.
- Assessment of fire protection, fuel storage, water service, and other safety systems.
- Review of operational practices, maintenance schedules, and available SOPs.

This review ensured the technical specifications in the transaction were validated, supporting a successful acquisition and future facility optimization.

Data center due diligence site evaluation for 8 data centers

Ramboll was selected to provide a due diligence site evaluation for over 8 data centers in the U.S. to assess their current operations and potential for expansion.

The scope included:

- Review of building infrastructures and data center operations. Evaluation of maintenance documentation (SOP, EOP, MOP), facility manpower, and capital expenditures over the last 5 years. Assessment of redundancy, limitations, SPOFs, commissioning reports, geo studies, BMS systems, security, and monitoring solutions.
- Analysis of refurbishment, maintenance, and upgrade capital requirements, as well as a review of expansion plans and budgets.

This evaluation helped identify areas for operational optimization, future expansion opportunities, and key infrastructure improvements.

02

Site feasibility analysis & master plan

Ramboll's extensive experience in the data center sector equips us with the knowledge to identify risks and opportunities early in the site selection process. We understand the critical factors that make a site suitable for a data center, such as power availability, infrastructure resilience, risk profiles, and access to fiber networks. Our global team of experts helps landowners and investors evaluate potential locations, ensuring they meet the technical, operational, and environmental requirements for long-term success. We provide detailed site feasibility studies and master planning services, enabling clients to make informed decisions, address potential constraints, and design sustainable, scalable solutions that align with evolving market demands. From site risk assessments to power agreements, our approach ensures every aspect of a data center's future development is thoroughly considered and strategically planned.

Services

- Site risk valuation analysis service
- Site suitability assessment (Available power, proximity to fiber)
- Site impact assessment
- Site development and permitting
- Lenders technical advisory (LTA)
- Market segmentation analysis

02.

SITE FEASIBILITY ANALYSIS
& MASTER PLAN

Multiple site feasibility analysis & master plan

Ramboll was selected to conduct a comprehensive assessment of multiple sites to support a data center development project.

Key services included:

- Market Analysis: Assessed site competitiveness, trends, and potential appeal to hyperscale customers.
- Power and Connectivity: Evaluated power capacity, incentives, and network connectivity options, including fiber proximity.
- Land and Facility Evaluation: Analyzed site acreage, facility power and land requirements, and water availability for cooling.

This analysis provided valuable insights for site selection and informed strategic decisions for future development.

Data center market segmentation analysis

Ramboll was selected to provide a site suitability assessment for a data center facility or campus, along with a market segmentation analysis to evaluate competition in the area.

Key services included:

- Power Accessibility and Capacity: Assessed available power sources, capacity levels, and relevant incentives for development.
- Fiber Proximity: Evaluated the proximity and availability of fiber networks for connectivity needs.
- Property “Red Flags”: Identified any potential concerns or limitations regarding the suitability of the site for a data center.
- Market Segmentation: Analyzed current market trends, competition, and projected entries, complete with timelines and contract values.

This data helped define the regional market, estimate growth, and identify target customer segments.

03

Greenfield design

As digital transformation accelerates, the need for resilient, scalable data centers grows. Ramboll's Greenfield design services offer comprehensive, innovative solutions for the development of mission-critical facilities.

Our approach ensures that each project is technically sound, strategically sustainable, and tailored to future needs.

With a focus on scalability, reliability, and sustainability, we provide expertise in MEP/FP design, CFD analysis, tenant-fit out, and supply chain support. Ramboll's team ensures that designs are optimized for efficiency and long-term performance, while aligning with the latest market trends and technologies.

From conceptualization to commissioning, Ramboll's Greenfield Design Service supports the creation of world-class, future-ready data center infrastructures.

Services

- Conceptual and Detail MEP/FP Design engineering
- Computational fluid dynamics (CFD) analysis
- Reliability availability and MTBF (meantime between failure) studies
- Architectural, civil & structural engineering, security and telecommunications services
- Tenant-Fit out design
- Prototype design
- Supply chain support
- Design-phase commissioning

03.
GREENFIELD DESIGN

Design of 54MW hyperscale colocation data center

An innovative greenfield colocation data center designed to accommodate the evolving needs of three major hyperscale clients. The design solution delivered flexibility across redundancy topologies—block redundant, distributed redundant, and N+2C—without additional cost, while optimizing IT load per hall and streamlining the building footprint.

The six-floor facility was reconfigured from an original seven-floor design, enabling increased IT density—from 4MW to 4.5MW per hall—while achieving significant capital savings for the client. The data center includes a Battery Energy Storage System (BESS) to provide demand response and grid support, enhancing both sustainability and revenue generation.

Ramboll provided MEP design services across RIBA Stages 2 through 5, including water conservation strategies, rainwater harvesting, and waste heat recovery for reuse in the adjacent office development. The design demonstrates a high-performance, cost-effective solution aligned with the priorities of global hyperscale operators.

Design of low-emission gas turbine data center

A first-of-its-kind facility integrating low-emission power technology, a cutting-edge greenfield data center leveraging gas turbines as the primary power source. The design incorporates carbon capture technology to eliminate emissions, aligning with the client's commitment to sustainability and innovation.

The project spans a 92-acre site in Norton, Ohio, supporting a 35,000 Sqm facility designed for a critical IT capacity of 90 MW. The data hall features a modular layout with paired IT and power enclosures across two levels, utilizing Vertiv solutions to ensure scalability and operational efficiency. Ramboll provided Master Planning through Detailed Design services. Our scope included mechanical, electrical, plumbing/fire protection, and acoustical engineering, with subconsultants delivering civil, structural, architectural, and cable plant design services.

04

Retrofit design

Ramboll's Retrofit Design Service leverages decades of experience in modernizing live data centers, ensuring that existing facilities are upgraded to meet the demands of rapidly evolving technologies like AI, IoT, and digital advancements.

We specialize in transforming older facilities into high-performance, scalable infrastructures that align with current and future business needs.

With a deep understanding of the complexities involved in upgrading active data centers, we focus on minimizing operational disruption during renovation.

Our expert team works closely with your internal facilities and operations teams to ensure a seamless transition, addressing potential challenges before they arise. Whether updating systems for efficiency, expanding capacity, or incorporating cutting-edge technologies, we have the expertise to deliver successful retrofits without causing unscheduled downtime.

Ramboll's Retrofit Design Service ensures your data center is equipped to handle tomorrow's digital demands, with the reliability and performance you need today.

Services

- MEP/FP system upgrades
- Capacity Expansions & Power Upgrades
- Cooling & Energy Efficiency Improvements
- Computational Fluid Dynamics (CFD) Analysis
- Live Facility Upgrades & Phased Implementation
- Security & Telecommunications Enhancements
- Sustainability & Compliance Consulting

04.
RETROFIT DESIGN

Hyperscale data center upgrades: retrofit engineering & construction support

Ramboll was selected to provide professional engineering and architectural services for this hyperscale provider on multiple data centers. The requested services included support for the design and construction administration at multiple data centers including final BOD, advanced drawings including 1-line electrical. Engineering calculations and analysis of existing loads, pre-purchase specifications and engineering drawings for all major mechanical and electrical long lead items, including preliminary sequence of operations.

Ramboll delivered the final documents to the contractor for cost estimation. Leading BIM coordination meetings of all disciplines, and issue, monitoring and owner assistance on permitting packages upon 90% completion of the construction documents. Assist Owner in negotiation and/or bidding the construction documents with potential contractors.

Urban data center retrofit: achieving 25% energy savings

Ramboll was selected to provide design upgrades for a 34,000 Sqm multi-story, multi-tenant data center in the heart of Los Angeles, California. The project aimed to develop a phased approach to upgrade the MEP infrastructure for the lower-level data center clients.

The retrofit involved the commissioning of Phase 1 improvements as well as construction administration services associated with the Central Plant B waterside economizer previously designed by a consultant. Working with the client, Ramboll focused on reducing power and water consumption while the data center remained fully operational. The project addressed several challenges such as maintaining code compliance, existing reliability, and constructability in an urban setting. These efforts resulted in up to 25% energy savings and 7% on water usage. Additionally, the project included the replacement of multiple equipment, including UPSs and generators.

05

Project management & construction oversight

Ramboll offers comprehensive project management and construction oversight services to ensure data center projects are delivered efficiently, on time, and within budget. With extensive experience in managing complex projects involving multiple subcontractors, we excel at coordinating diverse teams to meet critical milestones while maintaining cost control and operational efficiency.

Our structured project management approach ensures seamless collaboration between all stakeholders, guiding projects through every phase from planning to commissioning.

Ramboll's PMO and EPCM teams provide full lifecycle support, ensuring precision in every aspect, from preconstruction planning to risk mitigation, construction oversight, and commissioning.

With expertise in mission-critical facilities, Ramboll ensures your data center project is executed with precision, efficiency, and long-term reliability.

Services

- Advisory services
- Early-stage development services
- Local code compliance assurance
- Overall project management
- Permitting and compliance
- Procurement management
- Safety management
- Scheduling and health check schedule reviews
- Vendor management

05.

PROJECT MANAGEMENT
& CONSTRUCTION OVERSIGHT

PMO services for a 10x50MW of IT data center

Ramboll was selected to provide Client-side PMO services for this hyperscale, mission-critical facility located in Sweden. Our scope included Lead Project Management, HSE Management, Commissioning Management, QA/QC Management, Critical Environment Management, ITIM Infrastructure Management, Administration and Planning, and Local Code Compliance.

We were responsible for permitting coordination, communication with local authorities, and managing project stakeholders. The international project involved contractors from 12 nationalities, all coordinated to meet high safety standards and ensure that project targets were achieved.

Project management for a 24MW data center with LEED and CEEDA targets

Ramboll was selected to provide project management and lead consultant services for the construction of a new data center facility, the largest of its kind in the region. Our services spanned from feasibility through final handover. The facility, designed to deliver up to 24 MW of IT power, incorporates advanced sustainability measures, including a target PUE of 1.12 and the potential to recycle energy through heat pumps to supply district heating for thousands of homes.

The data center, built over multiple floors, is designed to be concurrently maintainable and will house up to 200,000 servers. It is also intended to achieve LEED Gold and CEEDA certification. Ramboll provided project management, design management, site monitoring, and safety coordination services throughout the project.

06

Commissioning & testing

Commissioning ensures that every system in your data center operates as intended, with maximum efficiency and reliability. Our approach spans from initial system testing to integrated operational assessments, ensuring seamless functionality across all components. We focus on optimizing system performance, minimizing energy consumption, and ensuring compliance with both design specifications and industry standards.

Our comprehensive commissioning services include power quality analysis, infrared inspections, and performance testing, providing a thorough evaluation of your data center's critical infrastructure. Through detailed documentation and expert analysis, we ensure your facility operates efficiently, supports operational continuity, and is ready for future challenges.

Services

- Level 1–5 commissioning
- Infrared inspections
- Policies, practices, and procedures (MOP/SOP)
- Power quality analysis
- Probability risk assessment
- Root cause failure analysis
- Annual infrastructure evaluation

06.

COMMISSIONING
& TESTING

Advanced data center campus commissioning for a 264MW high-performance colocation

Ramboll conducted comprehensive commissioning for a state-of-the-art data center campus, supporting 264 MW of critical infrastructure. The facility is designed for both air-cooled and liquid-cooled IT equipment, with up to 80% utilizing liquid cooling for optimized energy efficiency. Our scope included design review, commissioning of mechanical, electrical, and plumbing systems, and owner training. We also managed the commissioning of the tenant fitout, including the testing of water-cooled load banks on the ultra-clean server side of the heat exchangers.

Ramboll provided oversight for coordination between two general contractors, ensuring timely delivery and high QA/QC standards. Our team of commissioning agents worked on-site over two years, with staffing increasing to 18 agents during peak periods.

Cx excellence: commissioning a 150MW data center

Ramboll provided commissioning services for two data center buildings, each supporting nearly 150MW of critical power capacity in the Midwest USA.

The project encompassed five levels of commissioning:

- Level 1: Peer Review
- Level 2: Commissioning Documentation
- Level 3: Equipment Installation and Start-Ups
- Level 4: Component, Sub-system, and System Functional Tests
- Level 5: Integrated Systems Operational Tests

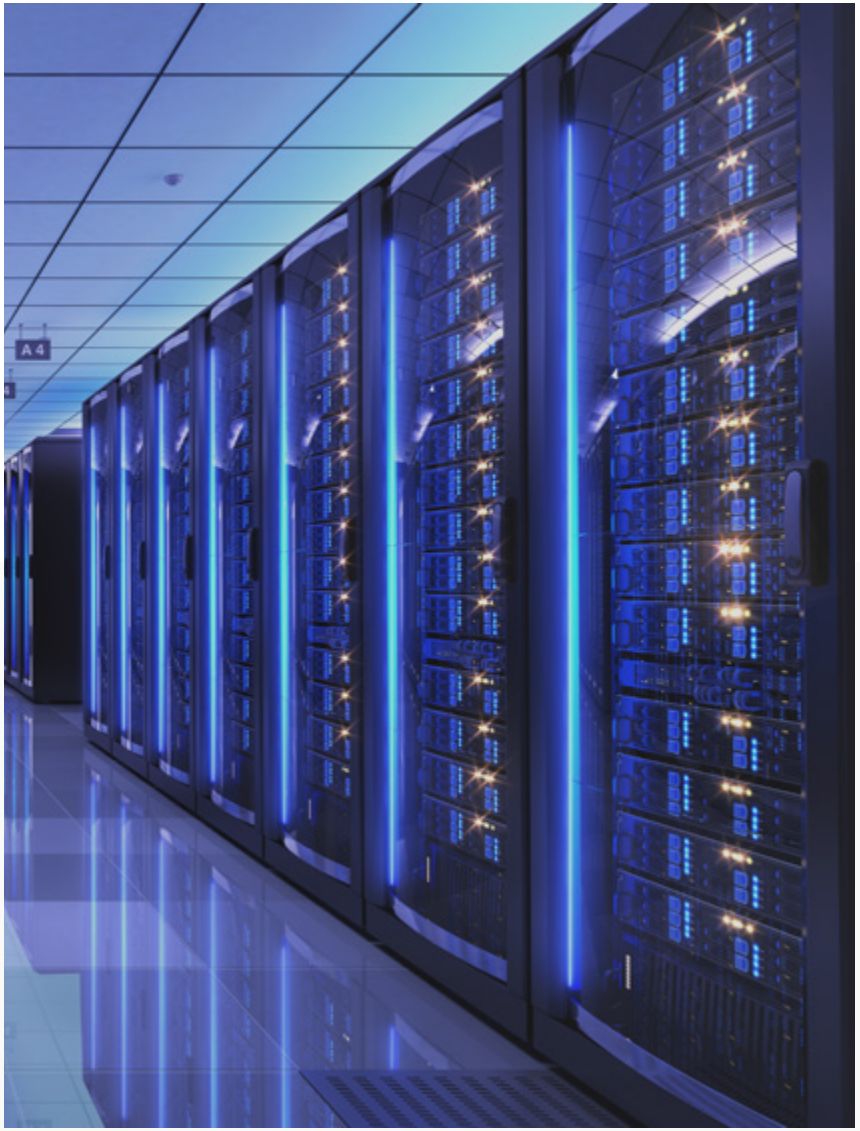
This structured approach ensured optimal performance, reliability, and efficiency, showcasing Ramboll's expertise in managing large-scale, mission-critical data center projects.

07

Strategic advisory

Ramboll offers tailored strategic advisory services to help clients navigate the evolving data center landscape with the integration of AI and advanced technologies. We focus on long-term strategies that combine in-house and colocation facilities with multicloud solutions, optimizing power, space, and cooling requirements to meet current and future demands.

Our services include hybrid IT strategy development, colocation source selection, colocation RFI development, and market segmentation analysis. We also provide conceptual master planning, preliminary engineering, and cloud readiness assessments, ensuring your infrastructure is scalable, AI-ready, resilient, and prepared for future challenges. By continuously developing proprietary tools and processes, we support clients with innovative solutions like industrial flexible and micro data centers, enhancing operational efficiency and adaptability.



Services

- Hybrid IT strategy
- On-premise and/or colocation source selection
- Colocation RFI development
- Market segmentation analysis
- Conceptual master planning and preliminary engineering
- Application cloud readiness assessment
- Co-location site risk assessment evaluation

07.
STRATEGIC ADVISORY

Global master planning and multi-site evaluations

Ramboll provided comprehensive data center facilities infrastructure assessments for a top-tier pharmaceutical company across 30+ data center sites globally. The client sought a complete assessment and asset inventory of its global data center portfolio to reassess its support model. Our scope included evaluating the facilities infrastructure, focusing on the physical installation, capabilities, capacities, and loads across electrical, mechanical, plumbing, and fire detection/ suppression systems. Additionally, we conducted a detailed IT and network asset inventory and developed accurate data center floor plan drawings.

Ramboll also supported the client with colocation RFI development and selection, TCO analysis (Capex vs. Opex), and data center sourcing options, ensuring a clear and strategic understanding of their infrastructure needs and opportunities for optimization.

Optimizing HPC & AI infrastructure: data center development vs. co-location study

Ramboll was selected to evaluate on-premises data center development versus colocation options for a High-Performance Computing (HPC) and AI expansion at a leading research university. The project included a TCO analysis, conceptual design for an on-premise solution, and RFI requirements for colocation providers.

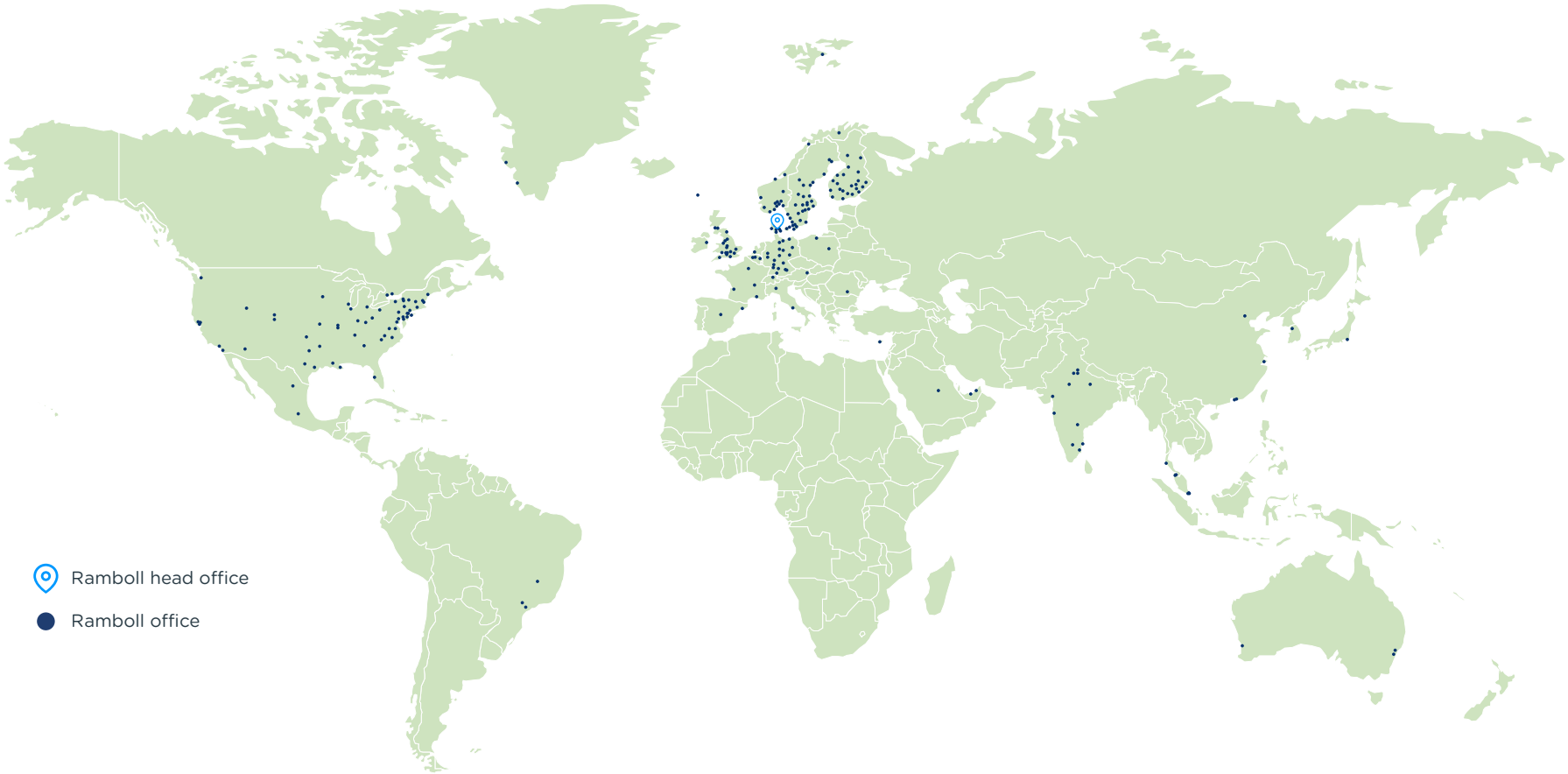
The design supported 100kW+ per rack with advanced liquid cooling, ensuring optimal performance and scalability. Ramboll conducted discovery workshops to define future needs, developed the RFI, and facilitated the selection of colocation candidates, ensuring the best solution to support the university's growth and strategic goals.

This comprehensive evaluation enabled the university to make informed, cost-effective decisions for their 7-year IT infrastructure capacity ramp.

About Ramboll

Ramboll is a leading engineering, design, and consultancy company founded in Denmark in 1945. We have globally recognized expertise in buildings, and energy, environment & health, water, and transportation.

The company employs approximately 18,500 experts worldwide. With more than 300 offices in 35 countries, Ramboll combines local experience and relationships with a global knowledge base. We diligently strive to achieve sustainable solutions that make a genuine difference to our clients, our clients' stakeholders, and to society.



Bright ideas. Sustainable change.

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