ARUP

Capability Pack | Data Centers

Strictly Confidential
October 2025

ARUP

Why Arup?

Arup is an independent firm of engineers, designers, planners, consultants and technical specialists. We operate globally, bringing creativity and technical excellence to everything we do.

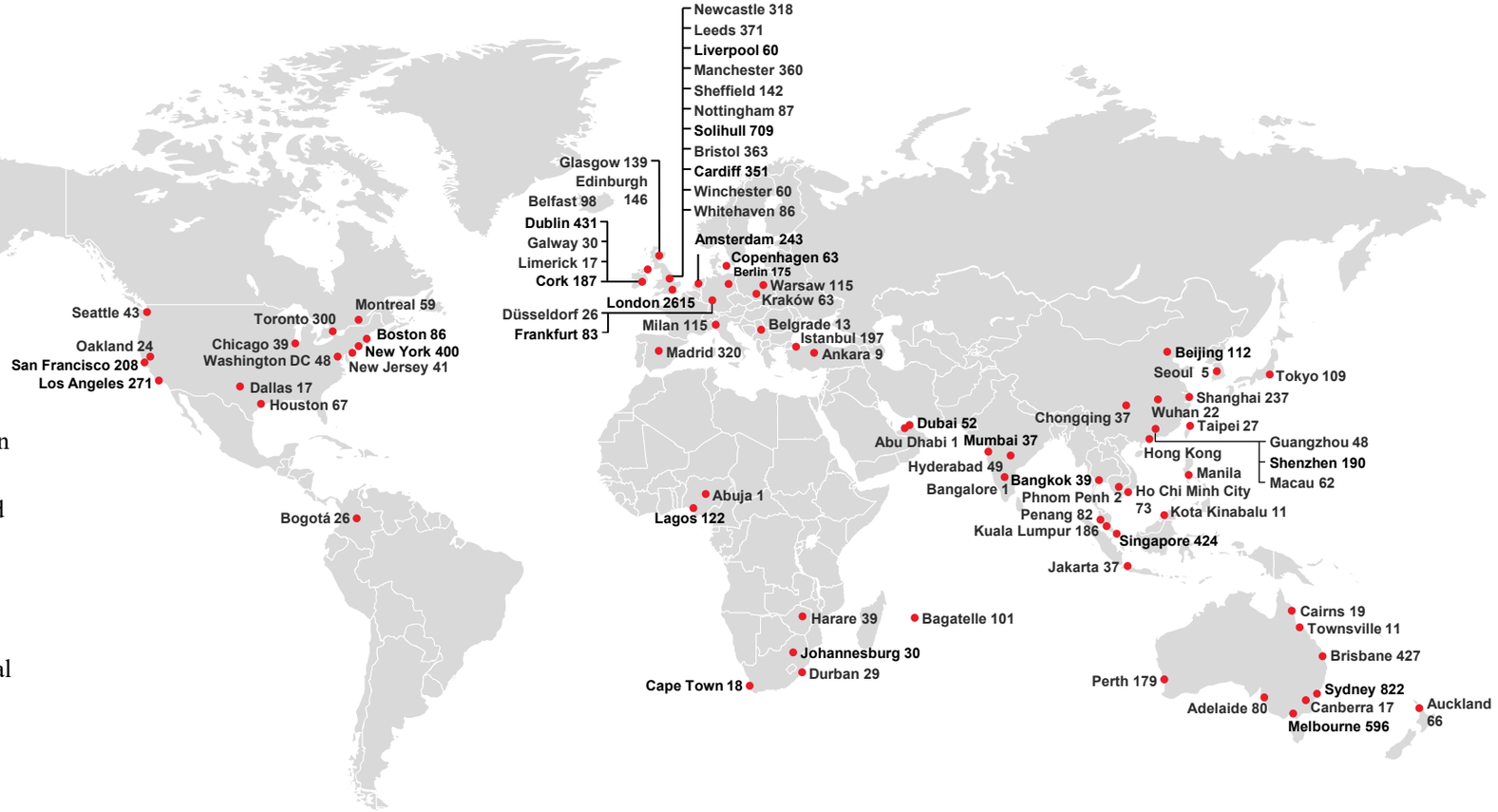
Local Knowledge, Global Expertise

Arup is an independent firm of designers, planners, engineers, consultants and technical specialists, working across every aspect of today's-built environment. Together we help our clients solve their most complex challenges – turning exciting ideas into tangible reality as we strive to find a better way and shape a better world.

We are truly global. From our 95 offices worldwide more than 18,000 consultants, engineers, designers and planners deliver innovative projects around the globe.

- We are one of the largest and most successful international engineering consultancies. We are not confined by geography, and collaborate seamlessly to bring the best of our expertise from around the world to each project, regardless of the region or jurisdiction;
- Our depth of expertise spans technical, environmental, regulatory, economic and financial feasibility through to planning and detailed design and is a unique proposition valued by investors and developers alike;
- Our extensive transaction track record, combined with robust process and methodology, enables confident infrastructure investment decision making.

Arup's teams of consultants, engineers and designers are constantly developing ideas and techniques to improve the built environment. With access to Arup's specialist networks around the world, the team brings global expertise to local projects.



ARUP

Why Arup?

Arup's Technical Advisory team is a leading advisor globally for low carbon energy infrastructure. We provide technical, commercial and corporate finance advisory services to support businesses invest, divest, pivot and grow. We help investors navigate complex and uncertain markets.

We provide technical, commercial and corporate finance advisory services backed by market insights and rigorous analysis, helping businesses to invest, divest, pivot and grow. We are driven by a common purpose to shape a better world through our technical expertise, a dedication to sustainable development and a commitment to environmental, social and governance (ESG) priorities.

What we do

We help investors and corporate clients to develop robust strategies and business plans to navigate a complex and uncertain market while capitalising on the opportunities presented by the transition to net zero emissions. In the deal cycle, we provide finance structuring advice and due diligence by experienced, commercially-astute engineers and business professionals. With a keen focus on sustainable development and operations, we give clients evidence-based assessments to be able to make investment decisions with confidence.

Our values and purpose

Sustainable development is central to everything we do as a firm, driven by a commitment to align all our activities with the UN Sustainable Development Goals (SDGs).

The environmental, sustainability and corporate governance agenda, and the regulations that drive it, are forces that are fundamentally reshaping how industries operate, especially energy infrastructure. Customer and client preferences and behaviours are evolving rapidly, and the scale of impact from climate change is triggering a global revolution in investor priorities. Arup helps organisations to navigate this changing landscape with confidence.

In brief

>465

deals closed since 2008

+$387bn

in successful transactions value

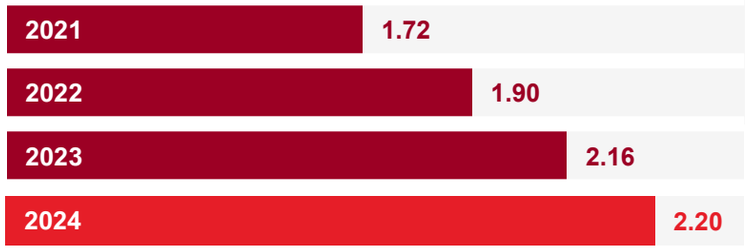
52

countries where deals have been closed

>18,000

business advisors, engineers, designers, architects and planners in 86 offices around the globe

Group revenue (£ billion)



IJInvestor AWARDS 2024

IJGlobal AWARDS 2023

IJInvestor Awards 2021 Technical Consultant of the Year – EMEA & Americas WINNER

2021 #1 TECHNICAL ADVISOR BY DEAL VALUE Infralogic

ARUP

Why Arup?

Arup is an award winning ESG advisor. We integrate ESG into wider technical and commercial due diligence and provide recommendations considering ESG value drivers. Our deep understanding of clients and their requirements make us a Preferred Advisor to governments and investors.

Environmental, social and governance (ESG) performance is now a key consideration when making investment decisions. ESG is starting to drive many transactions, especially with the ever-increasing move towards mandatory requirements around net zero and climate related disclosures.

Improving ESG performance is critical to reducing financial risk, achieving climate-resilient and sustainable growth and increasing value to investors; it can also help companies to recruit and retain talent.

Couple this with the rigour of current and future regulations and the need for robust ESG assessments and strategy has never been more crucial.

What we do

We support investors and corporate clients to navigate the world of ESG with confidence, providing pragmatic and clear advice.

Preferences and behaviours are evolving rapidly and the scale of impact from climate change and decarbonisation is triggering a global revolution in investor priorities.

With a focus on leading sustainable development and operations, we combine advisory skills with market insights and subject matter expertise drawing upon more than 18,000 specialists, working across 90+ disciplines in over 140 countries.

We believe that harnessing sustainable investments will be key to achieving the transition to a low carbon and climate resilient economy that also delivers social value and creates better outcomes for people, places and the planet.

Our values and purpose

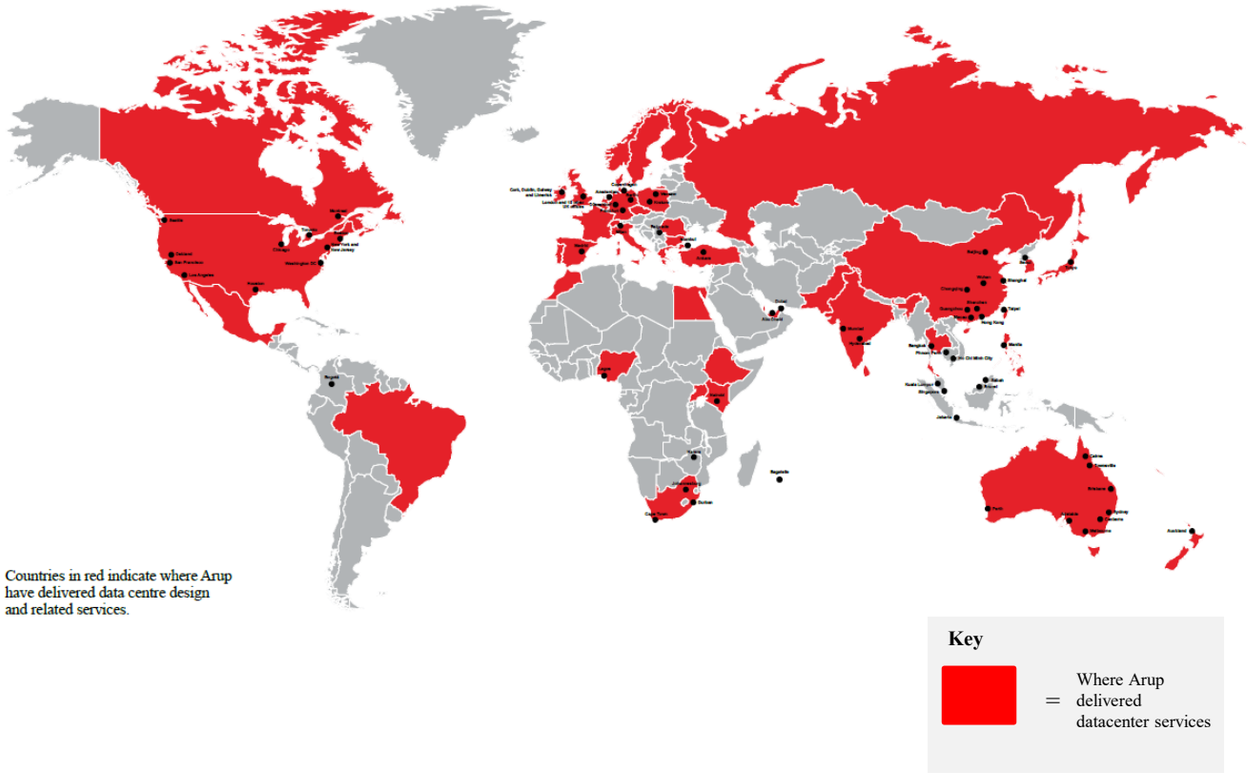
Arup's Global Strategy states "Sustainable Development is everything". In 1970, our founder Ove Arup, as part of the "Key Speech" that defines our company's culture, said "we should always be asking ourselves 'how does this create a more sustainable future for the world', and if it doesn't, we shouldn't be doing it." This philosophy is encapsulated within our sustainable development implementation strategy 'A Better Way', mapping out how Arup will help drive a radical shift to address climate change, making sustainable use of natural resources and delivering societal benefit. Our own actions provide insights to help amplify our impact by supporting clients in their ESG journey.

ARUP

Arup for Data Centers

Arup offers the full spectrum of data center planning, design, and operation, from advising on financing and site selection to defining performance requirements and managing construction. Our team has worked on over 50 transactions in data center, fiber and telecommunications infrastructure.

- **Familiar with Developers,** Arup has been involved with multiple datacenter design projects working with all major developers. Arup understands the design parameters in this fast-evolving space and able to leverage this experience with our transaction team. Arup's extensive in-house technical and design teams combines with our advisory knowledge to deliver projects for our clients through their entire lifecycle.
- **Dedicated to sustainable development**, Arup is a collective of 18,000 designers, advisors, and experts working across 140 countries. Founded to strive for humanity and excellence in everything that we do, we collaborate with our clients and partners, using imagination, technology, and rigor to shape a better world.
- **Arup's in-house experts have knowledge** in various aspects of data center operations, including structural, mechanical, electrical, and plumbing engineering; Building Information Modelling (BIM)/3D design; LEED consulting; and IT and communications consulting. By combining design and consultancy, we provide balanced, resource-efficient services that result in resilient, sustainable, and high-performance data centers.
- Our ability runs the **full spectrum of data center services** including planning, design, and operation, from advising on transactions, financing and site selection to defining performance requirements and managing construction.
- Our team of data center experts is dedicated to addressing the primary concerns of today's data center operators, which encompass transitioning to net zero, scalability, reliability, capacity planning, competitive design, technology selection, life cycle cost management, financing, and facility service expansion.



ARUP

Advisory for Data Centers

Arup provides an end-to-end suit of advisory services to support new and expanding Datacenter developments.

Strategy & Commercial

Market Assessment

- Key Market Trends
- Demand Analysis
- Competitive Assessment
- Regulatory Assessment
- Benchmarking
- Pricing Assessment

Business Plan / Viability Study

- Business plan formulation and viability study
- Validation of management commercial aspiration

Commercial Strategy

- Go-to-market strategy
- Evaluation of key potential customer segments
- Channel assessment and evaluation
- Sales & marketing model

Preparation for Fund Rising

- Fund Raising process Management
- Strategic position review in preparation for fund raising

Technical

Capital Delivery

- Cost plan review
- Procurement strategy/approach review
- Contract review
- Capex & Opex assessment

Technical Due Diligence

- Asset Design and condition
- MEP and Structural review
- Capex/Opex review
- Operations and Maintenance review
- Environmental Health & Safety review
- IT & Cybersecurity
- Lenders Technical Advisory

Operation and Organization

- Organization structure (roles & responsibility)
- Operation approach review
- MSA contract review
- Benchmark on best practices

ARUP

Arup Capability

Arup provides an end-to-end suit of advisory services to support new and expanding Datacenter developments.

Local knowledge, global expertise

Evaluation of the risks and vulnerabilities associated with insured and uninsured natural hazards, accidental hazards, criminal and terrorist threats, and offering tools and solutions will assist you in planning for the resilience of individual data assets, as well as corporate resilience. The opportunity is available to exert influence on the emergency response strategy and disaster recovery, which have a significant impact on business operations.

Datacenter sector expertise

Our cross-discipline technical expertise enables us to focus on specific aspects of a site and provide advice on ground conditions, environmental aspects and specific local utility capacity (e.g. power, water).

Strategic level

At the strategic level, our Advisory experts can support you to assess country-level considerations through our deep understanding of policy and regulatory issues, industry knowledge and technical expertise.

Location risk assessment

We apply site selection criteria to a range of sites to evaluate their resilience, enabling informed, audited decision-making. This allows for strategic risk management at either the single asset or portfolio level.

Site-Specific Due Diligence

We have the ability to apply valuable lessons learned from previous projects.

ARUP

Selected Experience

ARUP

Contents

Section 1: Americas Technical Advisory

Americas General Advisory Experience

Project Eden

Confidential Client | USA

Arup is currently engaged to provide technical and ESG due diligence services for a client considering investment in and debt financing of a 330MW, powered shell hyperscale data center project with a Capex greater than $1B, which is in the early stages of development. The engagement includes the preparation of both a Lenders' Technical Due Diligence Report and an ESG Report. Structured as a build-to-suit contract for a leading hyperscale operator, the technical review focuses on evaluating systems beyond the core and shell, including MEP systems, site suitability and selection, geotechnical conditions, and water infrastructure and consumption.

Arup's scope also covers physical security, capital delivery strategy, operations and maintenance planning, structural design and permitting, resilience, health and safety, governance, and social impact.

Project Y

Confidential Client | USA and Europe

Arup is providing lender technical advisory support on the project structuring and future financing of a 3+ GW data center campus in the United States.

The scope of work includes a comprehensive review of the project's commercial, technical, and operational aspects. Arup assessed the commercial structure, delivery strategy, and key agreements - including lease, and energy infrastructure contracts highlighting investor risk allocation. The technical review covered off-site and site development, building systems, and Capex benchmarking. Arup also evaluated the life cycle cost profile, including Capex, Opex, maintenance, and replacement costs. Operations and maintenance strategies were reviewed, including staffing, annual plans, and emergency response protocols.

Project Inference

AustrailanSuper | USA

Arup provided technical due diligence services for AustralianSuper's successful investment into Databank which included a portfolio of data centers. The portfolio has 69 operational data centers across 29 markets with an overall critical IT load of 473MW. Arup carried out a technical review of both operating and pipeline projects and focused our review on a set of sample sites. The technical review focused on review of MEP systems and Single Points of Failure, structural review, and network connectivity. The network connectivity scope included review of network service providers, fiber entry points, and cabling infrastructure and pathways to assess redundancy. Our scope also included physical security, capital delivery, O&M review, cybersecurity, resilience, and H&S assessments. Arup also reviewed the seller's business plan and planned capex and opex, providing inputs for the financial model.

Project X

Confidential Client | California, USA

Arup was engaged by a confidential client to conduct technical due diligence for a greenfield hyperscale data center development in the United States.

Arup evaluated the proposed systems and technologies to help mitigate risk for the long-term operational success of the facility. Arup brought together a multidisciplinary team of experts across data center design, structural engineering, mechanical and electrical systems, and emerging technologies. Our scope included a detailed review of design documents, technology performance, and implementation strategies. We conducted an evaluation of critical components, with a focus on identifying potential technical, financial, and operational risks. This rigorous analysis helped to validate the feasibility and reliability of the new design approach. Through this engagement, Arup delivered a comprehensive due diligence report that offered strategic insights and actionable recommendations.

Section 1: Americas Technical Advisory

Americas General Advisory Experience

Project Dino

Confidential Client | USA

Arup provided technical due diligence services in support of our client's potential investment into a global provider of hyperscale Data Centre campuses with a forecast of over 3GW of IT Load capacity.

Arup performed a technical review of the facility designs, key structural items, power secured, energy efficiency, current and future capacity, and redundancy/ single points of failure. Arup also provided a high-level review of site security and growth projects including a review of project delivery, permits, and schedule review. Arup also reviewed the seller's ESG commitments, environmental risk management, and climate resilience of one of the operational sites.

Project Echo

Confidential Client | USA and Europe

Arup provided technical and Environmental, Health & Safety (EHS) due diligence in support of our client's potential investment into a global provider of edge and hyperscale data center facilities. The target company operates 153 MW of capacity, with an additional 100+ MW currently under construction.

The portfolio differed from other market competitors as the deployments are based on creating smaller hubs outside of the main cities in underserved areas that needed more bandwidth at the edge of the network.

The due diligence involved a detailed desktop and site-based assessment of over 40 data centers across North America and Europe over a compressed transaction timeframe.

Project Z

Confidential Client | USA and Latam

Arup performed a review of the technical designs, including M&E systems, buildings and structures on a 21-site datacenter portfolio with 1.5 GW planned capacity by the end of 2025. Arup evaluated the business plan by developing a bottom-up Capex model, assessing Opex and reviewing financial model cost inputs. The capital delivery programme was assessed, which included a review of the project & development strategy, procurement strategy and programme review. The target's organization, operation and maintenance capabilities were also assessed, along with a review of customer Service Level Agreements, to evaluate long-term performance and risk mitigation.

Project Hyper

AustrailiaSuper, Global inc USA

Arup provided technical due diligence services for the potential acquisition of a significant minority stake in Vantage Data Centers Europe by AustraliaSuper. As of 2020, the Portfolio comprised of 22 sites across Europe and South Africa with a plan to grow from an operational capacity of 199MW to 1,847MW by 2030. Arup's scope featured technical and EHS due diligence focused on the technical integrity and network connectivity of the portfolio, which included M&E, design, and structural review as well as review of network service providers and connectivity infrastructure.

Arup also reviewed the business plan centered around the key capex and Opex drivers assessing seller's estimates and providing inputs for the financial model, as well as a review of the company's expansion plans and project delivery capabilities.

Section 1: Americas Technical Advisory

Americas General Advisory Experience

Project Titan

Investment Management Corporation of Ontario

Arup provided technical due diligence services for IMCO's successful investment into Scala, which includes of a portfolio of data centers in Brazil, Chile, Colombia, and Mexico. The portfolio has ~60 MW of operational capacity and anticipates an expansion capacity of ~1 GW. Arup carried out a technical review of both operating and pipeline projects and focused our review on six sample sites. The technical review focused on review of MEP systems and Single Points of Failure, structural review, and network connectivity. The network connectivity scope included review of network service providers, fiber entry points, and cabling infrastructure and pathways to assess redundancy. Our scope also included physical security, capital delivery, O&M review, cybersecurity, resilience, and H&S assessments. Arup also reviewed the seller's business plan and planned capex and opex, providing inputs for the financial model.

Project Fire VDD

5C Group | USA

Arup provided vendor technical due diligence services in the successful 5C selling an undisclosed stake in their company. 5C Group raised $835 Million of Capital from Brookfield and Deutsche Bank.

5C is a new entry developer of hyperscale datacenters. The portfolio included multiple projects across key U.S. markets, with significant planned capacity aimed at meeting growing hyperscale demand with over 1GW of pipeline development .Our scope focused on a detailed technical review of a selection of representative development sites. We assessed the MEP system designs with particular attention to identifying potential single points of failure. Connectivity and network resilience formed a key component of the review. This included analysis of planned fiber entry routes, carrier diversity, and internal cabling strategies to assess redundancy and future-proofing. In addition, Arup evaluated capital delivery, O&M and the forecast Capex and Opex.

Southeast Site assessment

Confidential Client | USA

Arup are advising a confidential client on the repositioning of a ~1,000-acre site in the Southeast of the USA, originally intended for a solar PV farm, to explore its potential sale for data center development.

Arup will assess the site's power infrastructure, including interconnection capacity and grid reliability; evaluate land-use constraints such as easements, setbacks, zoning, and noise ordinances; and determine the need for variances. A Class 1 hazard assessment will be conducted to evaluate exposure to natural and man-made risks, including climate trends. A geotechnical desktop review will analyze soil and bedrock conditions to inform foundation planning. Additionally, Arup will deliver a high-level market analysis covering data center typologies, developer profiles, market trends, local inventory, enabling infrastructure requirements, and a refined target buyer segment based on site fit and market interest.

Section 2: Americas Technical Advisory Resilience Studies

Americas Resilience Studies Experience

Cluster Resilience Study

Confidential Client | Bay Area, California

Quantitative multi-hazard risk assessment of a portfolio of 12 existing and new data centers. Conducted an in-depth evaluation for flooding, seismic, heat and air quality risks following a prioritization from a previous qualitative evaluation and provide risk mitigation recommendations. It involved: (i) probabilistically modeling the hazards with site-specific modeling and climate change downscaling, ground shaking modeling including liquefaction, and temperature and humidity evaluation for heat; (i) probabilistically modeling the vulnerability at building and component level, and (iii) probabilistically computing individual and shared fate risk in terms of downtime.

Resilience Study

Confidential Client | East and West Coast, US

Quantify downtime risk from both natural and accidental hazards due to direct damage and utility outage for 50+ critical facilities on the East and West Coast to inform retrofit strategies for existing assets and resilience-based design measures for new construction. A probabilistic wind, flood, earthquake, wildfire, and extreme temperature hazard analysis was conducted to determine intensity measures at various return periods. Both the potential risk to individual facilities as well as the probability for experiencing significant impacts across many datacenters simultaneously was assessed. The results of this study are being used to inform real estate decisions in this region and in the design of risk mitigation and resiliency measures.

Shared Fate Risk Assessments

Confidential Client | Midwest and West US

Quantitative multihazard risk assessment of new data centers (Site Twos) constructed adjacent to existing sites (Site Ones), for two locations in the Midwest and West of the US. Arup identified the key risks for the planned Site Twos with a focus on the shared fate risks and to help inform design teams around resilience enhancement considerations. The study involves deterministically modeling the integration of hazard, exposure, and vulnerability to obtain key risk metrics for decision making average annual downtime, probability of downtime duration in various timeframes and average downtime in a timeframe. Recommendations stemming from the risk results were proposed.

Multi-hazard risk assessments

Confidential Client | USA

Multi-hazard qualitative screening risk assessments for geophysical and hydrometeorological hazards for site selection due diligence for 35 prospective data center sites in the US. First batch of 15 included climate change in a qualitative summary, the second batch is being conducted I the iris platform. Assessing natural hazards in terms of likelihood and intensity, evaluating exposure and vulnerability of the sites to assess risk in terms of downtime and disruption of access roads, power and water utilities. Reported risk ratings and provided recommendations.

Section 2: Americas Technical Advisory Resilience Studies

Americas Resilience Studies Experience

Confidential Web Services

Confidential Client | USA & India

Arup performed due diligence on risks (e.g. natural hazards, industrial accidents and malicious threats) to 50+ data centers in Virginia and 10 in Mumbai.

Arup conducted a multi-hazard threat, vulnerability and risk and resilience assessments to provide guidance on location, design, and operational measures to reduce risk exposure when adding new datacenters. A cost-benefit analysis to determine justification for customers paying premiums for backup of web services across different regions was provided.

Accident Fund HQ DC

Accident Fund HQ | Michigan, USA

A former power plant, Arup worked with the Accident Fund IT team to inventory existing hardware and identify project growth requirements. The project employs 3x225 kVA rotary UPS units in a parallel redundant configuration and leverages district chilled water with on-site backup and free cooling options.

Arup provided mechanical, electrical and public health engineering (MEP), ICT full design, and façade consulting. Research included optimal ways to cool rooms, and produce plans for HVAC and ICT systems, positioning equipment and designing the cabling scheme between equipment racks in the room. Arup performed substantial planning work to achieve a layout that makes optimum use of the space available and provides the maximum capacity to expand and add equipment in the future.

Confidential DC expansion

Confidential Client | USA

Arup served as prime consultant for the 96 MW expansion of an existing data center campus.

An extensive meshed fiber cabling system that met high-reliability requirements while achieving a PUE of 1.2.

Section 3: Americas Technical Advisory Feasibility Studies

Americas Feasibility Studies Experience

Conceptual Hydrogen Datacenter DD

Confidential Client | USA

Arup is supporting a confidential client in an early-phase pre-positioning effort to explore hydrogen integration within a conceptual datacenter cluster.

This initiative aligns with the U.S. Department of Energy's national Hydrogen Hub funding program, which seeks to accelerate the adoption of clean hydrogen technologies across key sectors.

Arup conducted a focused assessment to evaluate hydrogen's potential role in providing backup or primary power, supporting decarbonization goals, and enhancing operational resilience. We explored integration scenarios with renewable energy, reviewed regulatory and infrastructure requirements, and identified key challenges and opportunities specific to the datacenter context.

Massachusetts Feasibility Studies

State of Massachusetts | USA

For over three years, Arup has partnered with the Massachusetts Department of Capital Asset Management and Maintenance (DCAMM), delivering a broad range of engineering services for the Springfield Data Center (SDC) and the Massachusetts Information Technology Center (MITC).

Our work has included uninterruptible power supply (UPS) system replacements, comprehensive energy audits, facility condition assessments, and sustainability evaluations. Arup has also conducted feasibility studies for potential expansion, helping DCAMM plan for future capacity needs while minimizing environmental impact..

Brampton Expansion feasibility

Confidential Client | Canada

Arup supported a confidential client with an expansion feasibility study and masterplan development for a proposed 450,000+ square foot site expansion in Brampton, Ontario. The study aimed to evaluate the site's capacity to accommodate future growth while ensuring alignment with utility infrastructure and long-term operational needs. Our team assessed requirements for expanded power capacity, including coordination with Ontario Hydro to plan a new electrical service. We developed phased implementation strategies aligned with the utility provider's projected capacity availability over a five-year period, helping the client manage risk and maintain flexibility. This work provided a roadmap for phased development, balancing technical, regulatory, and infrastructure considerations.

Powerplant transformation feasibility

Accident Fund HQ DC | USA

Arup partnered with the Accident Fund's IT team to understand the feasibility and support the transformation of a former power plant into a data and technology center. As part of the early planning phase, Arup conducted a detailed inventory of existing IT hardware and collaborated closely with the client to define future growth requirements. The facility's design includes three 225 kVA rotary uninterruptible power supply (UPS) units configured in a parallel redundant setup, ensuring high availability and system resilience. The project also takes advantage of district chilled water for efficient cooling, supported by on-site backup systems and free cooling options to enhance sustainability and reduce operational costs.

Section 4: Americas Technical Advisory Due Diligence

Americas Site Due Diligence Experience

Site Due Diligence

Confidential Client | USA

Due diligence assessment of 15 sites in two regions, that identified three primary sites in each region that progressed immediately into Design Engineering.

We collaborated extensively with the client to successfully address immediate project needs and changes while maintaining the fast-paced delivery schedule.

Key services provided: Standard due diligence scope of work, including site planning, permitting, flood risk, water infrastructure assessment, geotechnical, environmental consulting, transportation planning, sound and vibration analysis, blast risk analysis, and land surveying.

Site Due Diligence

Confidential Client | USA

Site due diligence services for 16 (200-2,000 acre) mega-campus sites in three regions. The Arup team identified significant risks and mitigation options for issues including water supply and wastewater discharge strategies for often remote sites, permit timelines for rezoning and flood risk in desert environs associated with on-site washes. We utilized the Tableau based risk register for regular updates to stakeholders to facilitate rapid multi-site risk comparisons. Test-fitting on these very large sites was aided by an automation tool that informs building placement by optimizing earthwork volumes.

Key services provided: Standard due diligence scope of work, including site planning, permitting, flood risk, water infrastructure, geotechnical, environmental, natural resources, weather and air quality, sound and vibration, traffic impact, blast risk, community assessment, land surveys, archaeology and cultural heritage and transport risk.

Site Due Diligence

Confidential Client | USA

Due diligence services for two 3-story data centres on an undeveloped 188-acre site.

The site is unusually constrained by immediately adjacent hotels and future high-density residential buildings. We verified that comprehensive noise mitigations are necessary, which need to remain within a 100ft height limit. The Arup/ERM team identified significant risks and mitigation options for other issues including permitting timeline advice regarding a rezoning application and amendment of proffers, off-site sewer improvements and localized ground improvements to mitigate surficial clays and avoid deep foundations.

Key services provided: Site planning, permitting, flood risk, water infrastructure, geotechnical, environmental, natural resources, weather and air quality, sound and vibration, traffic impact, blast risk, community assessment and transport risk.

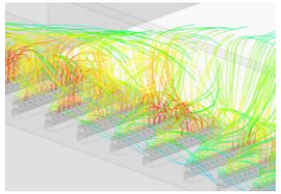
Site Due Diligence

Confidential Client | USA and Canada

Arup served as the prime consultant providing program-level site due diligence for approximately 100 potential data center locations across the United States and Canada. This large-scale effort supported a client's strategic site selection process, ensuring each location was evaluated thoroughly across a wide range of technical and regulatory criteria. Arup reviewed site planning, permitting pathways, flood and water risk, geotechnical conditions, environmental constraints, and physical access. We also analyzed site-specific factors such as sound and vibration impacts, blast risk, and land survey data to inform design feasibility and risk mitigation strategies. In addition, Arup reviewed design implications related to materials, mechanical, electrical, and plumbing systems (MEP), and coordinated evaluations of high-voltage and medium-voltage power connection potential.

Section 5: Americas Design Experience

Americas Design

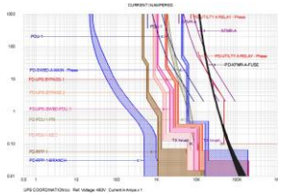


96MW Hyperscale Data Center Network

Confidential Client | 6 USA Locations

Arup is providing prime engineering for the design and construction administration of a 96MW network of 6 single-story, 4-pod, federal government data centers with the data halls, electrical rooms, mechanical rooms, office space, and all support spaces, including secure compartmented information facilities (SCIF) spaces of 100,000-120,000ft^2 each.

We have been responsible for the site due diligence, geotechnical investigations, permitting, complete A/E design, and construction administration for all sites. Our team provided core and shell design, working for developers on four sites and the client on two sites. We then provided tenant infrastructure design for the client on all six sites. Phases 1 and 2 of the project are complete, with Phases 3 and 4 finishing in 2026.



Data Centre Design

Confidential Client | USA

Arup designed a greenfield development for a new 50+ acre campus to include a 44MW data center. This project was completed under an accelerated timeline from masterplanning through permitting. We are the prime consultant with subconsultants, including an architect and local specialists for permitting. The engineering scope provided by Arup includes structural, mechanical, electrical, plumbing, civil, and geotechnical engineering; controls; and IT and communications, security, and sustainability consulting. One of the complexities addressed by Arup was that the site was developed adjacent to, and discharged stormwater to, wetlands under US Army Corp of Engineers (USACE) jurisdiction that are also the site of future Phase 2 data center expansion. This required an integrated engineering response to both protect the wetlands and mitigate flood risk to the data center and generated a complex permitting requirement, which Arup navigated with the local specialists.

Confidential Data Center Expansion

Confidential Client | USA

Arup was prime consultant for a 96MW expansion of an existing data center campus with 590,000ft^2 of whitespace. The design involved coordination with existing in-house design standards, delivery of medium and low-voltage electrical distribution and an extensive meshed fiber cabling system to satisfy the client's high-reliability requirements while achieving a PUE of 1.2. Arup also suggested long-term improvements to the standard design as value-engineering options. The design was developed as multiple, individual packages to allow for phased construction efforts. Beyond the massive scale of the facility, interesting features include direct evaporative cooling and distributed redundant power distribution.

New Build Colocation Data Center

Confidential Client | USA

Arup is providing mechanical, electrical, and fire protection services for the design of a 340,000ft^2 new build data center with a capacity of up to 38.4MW at full build-out. This new data center build was on a greenfield site, followed the client's building basis of design (BoD), and was then deployed on a constrained site. We adapted the clients BoD to maintain their topology and expected building SLA to a non-standard building configuration.

Section 6: Americas Risk Assessments

Americas Data Center Risk Assessments Experience

Cluster Resilience Study

Confidential Client | USA

Quantitative multi-hazard risk assessment of a portfolio of 12 existing and new data centers in the Bay Area, California. Conducted an in-depth evaluation for flooding, seismic, heat and air quality risks following a prioritization from a previous qualitative evaluation and provide risk mitigation recommendations. It involved: (i) probabilistically modeling the hazards with site-specific modeling and climate change downscaling, ground shaking modeling including liquefaction, and temperature and humidity evaluation for heat; (i) probabilistically modeling the vulnerability at building and component level, and (iii) probabilistically computing individual and shared fate risk in terms of downtime.

Resilience Study

Confidential Client | USA

Quantify downtime risk from both natural and accidental hazards due to direct damage and utility outage for 50+ critical facilities on the East and West Coast to inform retrofit strategies for existing assets and resilience-based design measures for new construction. A probabilistic wind, flood, earthquake, wildfire, and extreme temperature hazard analysis was conducted to determine intensity measures at various return periods. Both the potential risk to individual facilities as well as the probability for experiencing significant impacts across many datacenters simultaneously was assessed. The results of this study are being used to inform real estate decisions in this region and in the design of risk mitigation and resiliency measures.

Shared Fate Risk Assessments

Confidential Client | USA

Quantitative multihazard risk assessment of new data centers (Site Twos) constructed adjacent to existing sites (Site Ones), for two locations in the Midwest and West of the US. Identify the key risks for the planned Site Twos with a focus on the shared fate risks and to help inform design teams around resilience enhancement considerations. The study involves deterministically modeling the integration of hazard, exposure, and vulnerability to obtain key risk metrics for decision making average annual downtime, probability of downtime duration in various timeframes and average downtime in a timeframe. Recommendations stemming from the risk results were proposed.

Multi-hazard risk assessments

Confidential Client | USA

Multi-hazard qualitative screening risk assessments for geophysical and hydrometeorological hazards for site selection due diligence for 35 prospective data center sites in the US. First batch of 15 included climate change in a qualitative summary, the second batch is being conducted I the iris platform. Assessing natural hazards in terms of likelihood and intensity, evaluating exposure and vulnerability of the sites to assess risk in terms of downtime and disruption of access roads, power and water utilities. Reported risk ratings and provided recommendations.

Section 7: Americas Datacenter E&S

E&S Due Diligence and Monitoring Experience

Gigafactory Independent E&S Consultant

Confidential Client | USA

Arup is providing independent E&S Due Diligence (ESDD) to support an estimated $3 billion USD loan from an international consortium of lenders for construction and initial operations of a 35GWh EV gigafactory in Georgia.

The ESDD scope includes the review of E&S permits required under national, state, and local laws, as well as the review of compliance risk and opportunities related to meeting applicable performance standards. Arup assessed the project's social and environmental compliance in accordance with IFC Performance Standards, Equator Principles IV, and OECD Common Approaches.

The Project is scheduled to reach financial close Q2 2025.

Project Jupiter ESDD

Confidential Client | USA

Arup is providing E&S Due Diligence (ESDD) to support an estimated $550 million USD loan from an Export Credit Agency for the construction of a 300 metric tons per day (MTPD) modular green ammonia production facility in the Southern U.S. The project will adhere to both the US Inflation Reduction Act 45v (Clean Hydrogen Production Tax Credit) regulations and the European Union Renewable Fuels of Non-Biological Origin (EU RFNBO) regulations, as the off-taker is based in the EU.

Arup's review is based on applicable local environmental and social regulations, the IFC Performance Standards, Equator Principles IV, OECD Common Approaches, and the EU Taxonomy for Sustainable Activities.

The Project is scheduled to reach financial close Q2 2025.

Project Y ESDD

Confidential Client | USA

Arup is providing E&S Due Diligence to support the project structuring and future financing of a 3+ GW data center campus in the United States.

The ESDD scope includes the review of E&S permits required under national, state, and local laws, as well as the review of compliance risk and opportunities related to meeting applicable performance standards. Arup assessed the project's social and environmental compliance in accordance with IFC Performance Standards, Equator Principles IV, and OECD Common Approaches, as well as gave recommendations based on current SBTi and GHG Protocol standards for carbon disclosure. Arup also conducted location-specific physical hazard analysis to provide mitigation and design recommendations.

The Project is scheduled to reach financial close in 2025.

Project T Feasibility Study

Confidential Client | Tennessee

Arup conducted a Technical Feasibility Study for an AI data center campus in the United States with a total IT load capacity of 210MW. The project included a preliminary land assessment, and analysis of power infrastructure, network connectivity, water resources, local infrastructure, regulatory and compliance, climate and environmental conditions, construction feasibility, future expansion, community impact, cost, and risk.

The project also included an ESG assessment, which included an evaluation of current permits and a permitting roadmap, estimation of annual GHG emissions, assessment of decarbonization pathways, circular economy models, and an IFC materiality matrix to understand the materiality and necessary actions for the Project to align with the IFC E&S Performance standards .

Section 8: Global Datacenters

International Relevant Experience

Telecoms in France – TDD

Confidential Client | France

Arup worked with a major communications company in Europe providing broadcast, infrastructure, and upstream media services. The company owned and operated four data centers with plans to set up 14 more across France.

Arup provided a technical review of the client's assets, network performance, and environmental, health and safety performance.

Arup also undertook a comprehensive review of the operational performance, Capex, Opex, and business plan.

Data Center - VDD

Confidential Client | Poland

Arup advised a confidential client on the acquisition of 2 data centres in Sydney and Adelaide, with a total capacity of approximately 8.7MW. This involved conducting both a technical and EHS due diligence on both assets to determine whether the following aspects where up to standard: design and integrity, operations & performance, security, business plan and EHS review.

Our work throughout this process provided the asset owners with confidence in our technical abilities, resulting in a follow-on engagement around the detailed design of the expansion plans for both Sydney and Adelaide sites.

Project Kilowatt, TDD & ESG DD

Confidential Client | Australia

Arup advised a confidential client on the acquisition of 2 data centres in Sydney and Adelaide, with a total capacity of approximately 8.7MW. This involved conducting both a technical and EHS due diligence on both assets to determine whether the following aspects where up to standard: design and integrity, operations & performance, security, business plan and EHS review.

Our work throughout this process provided the asset owners with confidence in our technical abilities, resulting in a follow-on engagement around the detailed design of the expansion plans for both Sydney and Adelaide sites.

Project Argon, TDD & ESG DD

Confidential Client | Asia Pacific

Arup advised a confidential client on the acquisition of a portfolio of data centres throughout the Asia Pacific region. This portfolio consisted of 2 existing data centres in Australia and 2 data centres in development, one in Singapore and the other in Hong Kong. The combined capacity of this portfolio is over 250MW.

Arup conducted both a technical & environmental, Health & Safety (EHS) due diligence on the portfolio.

The Due Diligence included technical design and integrity, certificates and contracts, operations and performance, business plan review and EHS compliance.

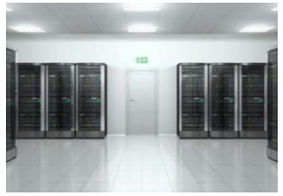
Section 8: Global Datacenters

International Relevant Experience

Ficolo - DC

Confidential Client | Finland

Arup advised a confidential client on the on the buy-side technical, Environmental, Health and Safety (EHS) due diligence report for a Digital9 on their acquisition of Ficolo Data Centres in Finland. The transaction perimeter involved the acquisition of three data centres across Finland and a connectivity hub point. Arup's project scope involved conducting a review on the portfolio of three sites to determine whether the following aspects where up to standard Technical Integrity and Design, Operations and Organization, IT, Cloud & Cybersecurity, Business plan and EHS review. The due diligence involved a detailed desktop and site-based assessment across the three Finnish sites in a compressed transaction timeframe.



Confidential Telecoms Carve Out

Confidential Client | Europe

Arup is currently providing vendor technical & EHS due diligence services to assist with the carve out and investment process of a major European Telecom Operator's Data Centre Portfolio. The portfolio comprises of over 400 sites. The carve out is looking to create a new company in which an investor will take a 50% stake in the business. The company is looking to expand its portfolio, upgrading existing assets and building new facilities that will be attractive in the growing Edge Data Centre market. Arup will opine on Management's current operations of the portfolio and the planned future growth and work closely with Management to assess their business plan, forecast growth capex and maintenance capex forecasts and asset characteristics & design, performance with KPI benchmarking.

Vendor Technical Due Diligence

Beyond.pl | Poland

Arup is currently providing vendor technical due diligence services to assist with the sale of a Polish Data Centre portfolio consisting of a cluster of data centres in a strategic location which is currently being developed to support a host of client types. This transaction consists of a full sale by the owning organization. Arup will opine on asset management & operational running of the portfolio, as well as comment on capex implications from this technical review. Our work will include assessing the design and engineering of future developments against industry norms and client expectations, as well as offer an in-depth review of the maintenance capex refresh cycles in the Management business plan and has already undertaken test fit studies on proposed expansion projects within the portfolio.

Datum UK Data Center

UBS Asset Management | UK

Arup were previously hired by UBS Asset Management to provide buy-side Commercial and Technical due diligence services for the purchase of 5MW data centre facility in Farnborough. Datum is an Enterprise Co-location provider located in one of the most strategic locations near London. It is a tier-3 type data centre located in a very secure location. Arup provided a full commercial and technical due diligence, including a complete review of management go-to-market strategy and channel approach. The project also included the planned expansion, assessing the business plan and associated forecast capex spend. As part of this Due Diligence, Arup delivered a red flag report for the client, reviewing the commercial and technical assets and business plan.

Section 8: Global Datacenters

International Relevant Experience

Project Blade

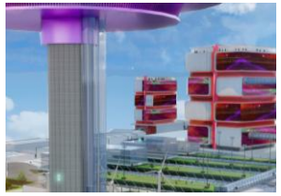
Confidential Client | Sweden

Arup provided Technical and Environmental, Health and Safety (EHS) vendor due diligence in relation to HPC data centers located in the Nordics. The portfolio consisted of 8 facilities located on 5 campuses offering 93 MW of IT Load in 3 countries. The data centers used 100% green energy across the platform. The data centers were spread across 3 markets (Norway, Sweden and Denmark) which all have a large or growing renewable energy presence. Arup undertook a review of the M&E, architectural, structural and fire safety design of facilities. Our work consisted of a high-level review of how environmental, social and governance issues are addressed alongside the systems in place to manage environmental and social risks.

University of Southampton DC

University of Southampton | UK

The University of Southampton had outgrown its existing data center and required additional space and power to expand services, improve resilience and energy efficiency. The new data center houses critical services including campus IT connectivity, student services and High-Performance Computing (HPC). The current HPC array is ranked as the 265th fastest supercomputer in the world. The new facility provides 3 times the power and cooling previously available, allowing the university to expand their HPC capability. As lead consultant, Arup led the design team, delivering the MEP and ITC design. The ITC team provided strategic advice for the network design, Network Operations Centre and the HPC upgrade.



Project Kilowatt, TDD & ESG DD

Confidential Client | Europe

Arup provided design services, working alongside an appointed architect, for a confidential client's HPC data center. Arup provided the following design services: electrical engineering services, mechanical engineering services, public health and fire suppression engineering services, security services and telecoms services. Arup used its fundamental knowledge of the data center market, customer needs, available technologies, risks and opportunities, and legislative requirements to deliver the best possible outcome for the client. The Arup team also utilized their procurement expertise to explore the feasibility of various modular solutions and procurement strategies and integrated our knowledge of sustainability, circularity, and nature inclusivity in the final deliverable.

HPC Engineering and Design

Confidential Client | UK

Arup provided mechanical, electrical and public health engineering design for stages 4 and 5 of a new HPC facility in the UK. Our contribution also included creation of an MEP model to BIM Level 2 standards. Our team worked alongside other advisors to develop the building's detailed design and to provide energy-efficient solutions for the technology housed within it. The design incorporates high levels of adaptability, whilst protecting the cost effectiveness and efficient performance, as well as allowing future connection to a district heating network powered by wasted heat should such a network is installed at the science park.

Section 8: Global Datacenters

International Relevant Experience

Telecoms Data Centre – VDD

Confidential Client | Europe

Arup provided vendor technical and EHS due diligence services for the investment process of a major European Telecom Operator's Data Centre Portfolio of over 400 sites. The client looked to expand their portfolio and upgrade existing assets.

Arup opined on Management's current operations of the portfolio and future growth. Arup worked with the client to assess their business plan, forecast Capex, characterize assets, and provided performance KPI benchmarking.

Data4 - Buy-side

European Data Center Portfolio | Europe

Arup provided buy-side technical and EHS due diligence a large European data centre portfolio. The entire business, including 26 facilities in 4 European countries and an expansion plan to reach 66 data centres by 2031, was reviewed for competence across the following aspects: power availability, technical design and integrity; organisation, operations and management; EHS; growth capex, maintenance capex and opex forecasts; and capital delivery. Arup utilised a lifecycle maintenance framework, reviewed maintenance contracts and evaluated current SLAs to assess their current mechanical and electrical arrangement and compare with capex/opex business plan forecast.

France DC & Portugal DC Sell Side

Confidential Client | France and Portugal

Arup advised on the sell side technical, Environmental, Health and Safety (EHS) due in relation to a 92 meshed edge data centre portfolio located in France and a data centre in Portugal with a capacity of 6.8 MW.

Arup provided an overview and assessment of the asset design and integrity of the portfolio. Arup used industry knowledge to comment on the equipment used, including quality of provider, remaining equipment life and the maintenance connotations.

Arup also reviewed the Capex & Opex business plan, commenting on the viability of expansion plans given the forecast spending plan. As part of the environmental, health and safety part of the report, Arup provided comment on the energy use.

Netrics DC

Confidential Client | Sweden

Arup provided buy-side technical, Environmental, Health and Safety (EHS) due diligence for a client related to the potential acquisition of Netrics, a Swiss data centre portfolio. Arup's scope included a review of three data centre facilities and connectivity assets, assessing infrastructure, organisation, operations management, EHS, forecast growth capex and maintenance capex forecasts. Arup developed a lifecycle maintenance framework, reviewed maintenance contracts and evaluated current SLAs to assess their current mechanical and electrical arrangement and compare with capex/opex business plan forecast. Arup also established an assessment framework to conduct a review of the connectivity business that covers the service offering, the technology utilised and how the business is operated.

Section 8: Global Datacenters

International Relevant Experience

Technical and EHS Due Diligence

DEAC | Latvia

Arup provided Technical and EHS buy-side due diligence in relation to a new datacenter construction in Latvia. Arup were engaged by DEAC on behalf of Quaero Capital to undertake a high-level due diligence on the proposed plan to demolish the existing warehouse and construct the new datacenter facility on this site with a capacity of 6MW. Arup undertook a review of the M&E, architectural, structural and fire safety design of the proposed facility. Our work also consisted of a review of the capital delivery strategy and key risks associated with this project. This includes reviewing the cost plan and checking if there are sufficient contingencies built in.

Swedish DC Portfolio

Sweden | Confidential Client

Arup provided buy-side Commercial and Technical DD support for the acquisition of an equity share of an established data center organization in Europe who advocate for sustainability in digital lifecycles. The scope of this project focused on key commercial, technical and EHS risks that our client would need to consider in relation to the acquisition of the business. Assessments of viability took place to measure the achievability in their significant growth from both a commercial and technical perspective. The scope included a review of the data center facilities to conduct assessments surrounding the current market, competitive dynamics, infrastructure, connectivity, organization, operations management, cyber security, key contracts and business plan.

Telecoms Data Centre Carve out

Atman | Poland

Arup recently undertook a Vendor Due Diligence engagement on behalf of Atman in their successful divestment of Atman's (ATM) datacenter portfolio in Poland.

ATM runs three data centers in Poland totaling 42MW: WAW-1 and WAW-2 in Warsaw, and KTW-1 in Katowice.

As part of the due diligence, Arup also reviewed the feasibility of the programme and capex forecasts associated with their build programme.

Greenfield RaxioTechnical/EHS DD

Meridiam

Arup advised Meridiam on their successful acquisition of First Brick Holding's Raxio Datacenter portfolio in Africa. The portfolio included two sites in Uganda and Ethiopia respectively with a greenfield construction of additional 10 sites across Africa at ~1.5MW. Arup undertook a comprehensive review of the M&E, architectural, structural and fire safety design of the proposed construction projects. Arup also undertook a review of Management's procurement strategy and their approach towards programme and cost management. As part of the engagement, Arup developed a lifecycle maintenance capex framework for Meridiam's overall business plan forecast.

ARUP

Dr. Tobi Ann Petrocelli
Sustainable Investment Advisory
Arup

140 Broadway
New York, NY 10005, USA
t +1 212 896 3000
m +1 917 848 1487