Engineering the next generation of mission-critical digital infrastructure

"60+ years designing and building mission-critical infrastructure across 80 countries"

Discover our capabilities

ABOUT US

Who We Are

A global engineering group specialized in high-complexity, mission-critical infrastructure

Top 20 international Engineering & Construction Firms specialized in power generation

- +60 years of experience
- +100 GW developed

Fully integrated engineering capabilities throughout the project value chain and plant lifecycle

- Highly experience professionals
- +10 years average seniority
- 1,400 employers

Holistic supply chain expertise and customer profiles, from regulators and lenders, to EPCs, IPPs and Utilities

Compelling portfolio acreoss all generation technologies: from renewables and fossil fuels up to nuclear (fussion & fission)

Long and successful track record with world class customers in 80 conutries

REFERENCE SUMMARY

Multi-technology experience allowing to efficiently integrate energy sources

+100 GW developed

+700 Power Plants

Renewable Energy (PV, Wind & BESS)
43,056 MW

Power-To-X
3,641 MW

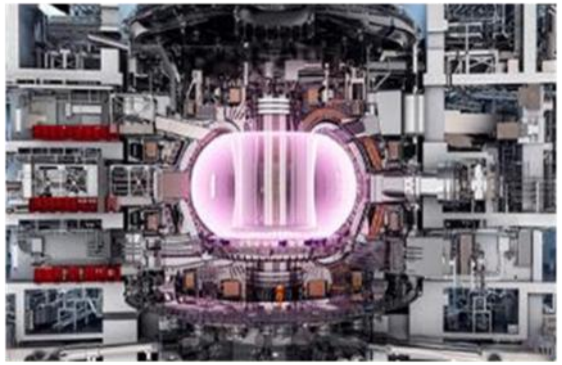
CSP
1,540 MW

Nuclear
10,386 MW

Thermal Power Plants
42,509 MW

Hydroelectric Power Plants
1,138 MW

MAIN ACTIVITIES



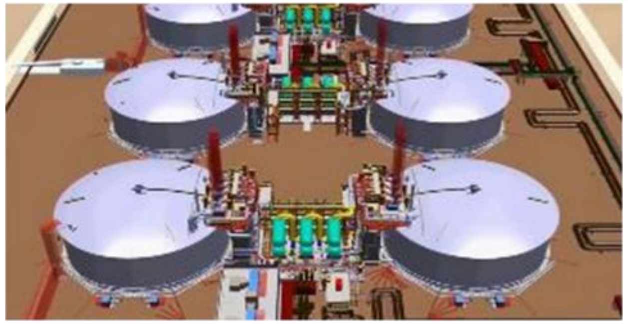
Nuclear New Build, SMR & Advanced Projects

Thermoelectrical (Gas, Fuel, Coal...)

Data Centres

Renewable energies (CSP, WTE, Biomass...)

Operating NPPs, Decommissioning & Radwaste Disposal



Computing & Simulation

Infrastructure

The Roadmap for developing a Data Center

Preparation and Brief – RIBA 1

- Derisking
- Due Diligence
- Pre-Concept Design
- Regulatory Advisory
- Power Demand Assesment
- Energy Mix
- Test Fit

Basic – RIBA 2-3

- Concept Design
- Power and cooling demand modelling
- HVAC & Cooling selection
- Schematic Design
- Simulation and optimization
- Scalability Redundancy Constructability
- Sustainability Strategies

Detailed – RIBA 4

- Detailed technical Design
- Permitting & Licensing
- Design Validation vs Failure Scenarios

Construction & Operation – RIBA 5

- Project Management
- Construction Supervision/ EPC
- Testing, Commissioning & Performance Validation
- Real time Monitoring and Optimization
- O&M Support

RIBA 2-3 Concept & Schematic Stage

TRANSFORMING EARLY-STAGE ASSUMPTIONS INTO VALIDATED PERFORMANCE-BASED DESIGN DECISIONS

Demand Modelling

BIM-based dynamic thermophysical modelling, incorporating envelope behaviour, solar radiation, occupancy loads and shading effects, to generate realistic time-dependent thermal demand profiles and support accurate early-stage sizing and optimization of cooling and energy systems.

Simulation-Driven Design Feedback

Simulation-driven design feedback integration, enabling continuous interaction between the Digital Twin and the engineering team through iterative exchange of design inputs and performance analyses. This supports informed decision-making from early stages and turns simulation into an active design tool rather than a post-design verification step.

Climate& Load-Adaptive Systems selection

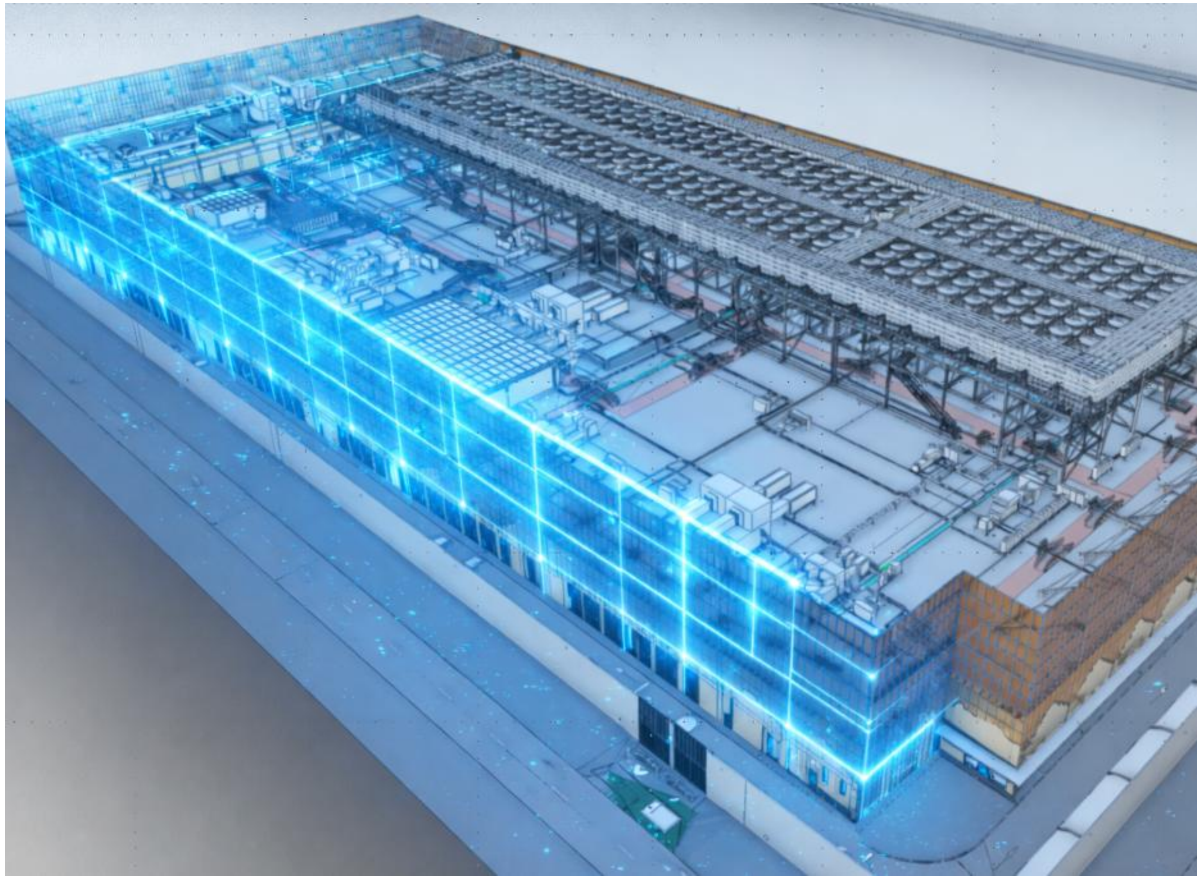
Climate& load-adaptive cooling strategy simulation, using high-resolution (15-minute to hourly) weather-based and rack density based dynamic modelling to benchmark alternative HVAC architectures across the full year, identify peak energy demand periods, and select the solution delivering optimal performance and Dynamic PUE—while highlighting short-duration efficiency gaps where targeted backup energy strategies or demand adjustments can maintain efficiency targets.

Dynamic PUE level 1-Climate

Performance Optimization

Physics-based systems performance optimization, using equation-driven dynamic simulation of pumps, chillers, fans, compressors and fluid networks with real performance curves, hydraulic losses, control logic (PID, staging, free-cooling activation) and transient operating conditions. This enables high-fidelity prediction of Dynamic PUE and energy behaviour under real operating scenarios, supporting precise equipment selection and early CAPEX/OPEX optimization.

Dynamic PUE level 2-Performance



RIBA 4 Detailed Design Stage

REFINING ENGINEERING SOLUTIONS INTO RESILIENT, FAILURE-VALIDATED AND OPERATION-READY SYSTEMS

Scalability Analysis

Rack-density adaptive scalability modelling, enabling rapid simulation of future IT load growth, rack densification scenarios and evolving usage profiles (e.g. AI-ready deployments) to verify infrastructure resilience, cooling capacity margins and expansion readiness. This supports forward-looking design decisions and ensures the facility can adapt efficiently to changing performance requirements over its lifecycle.

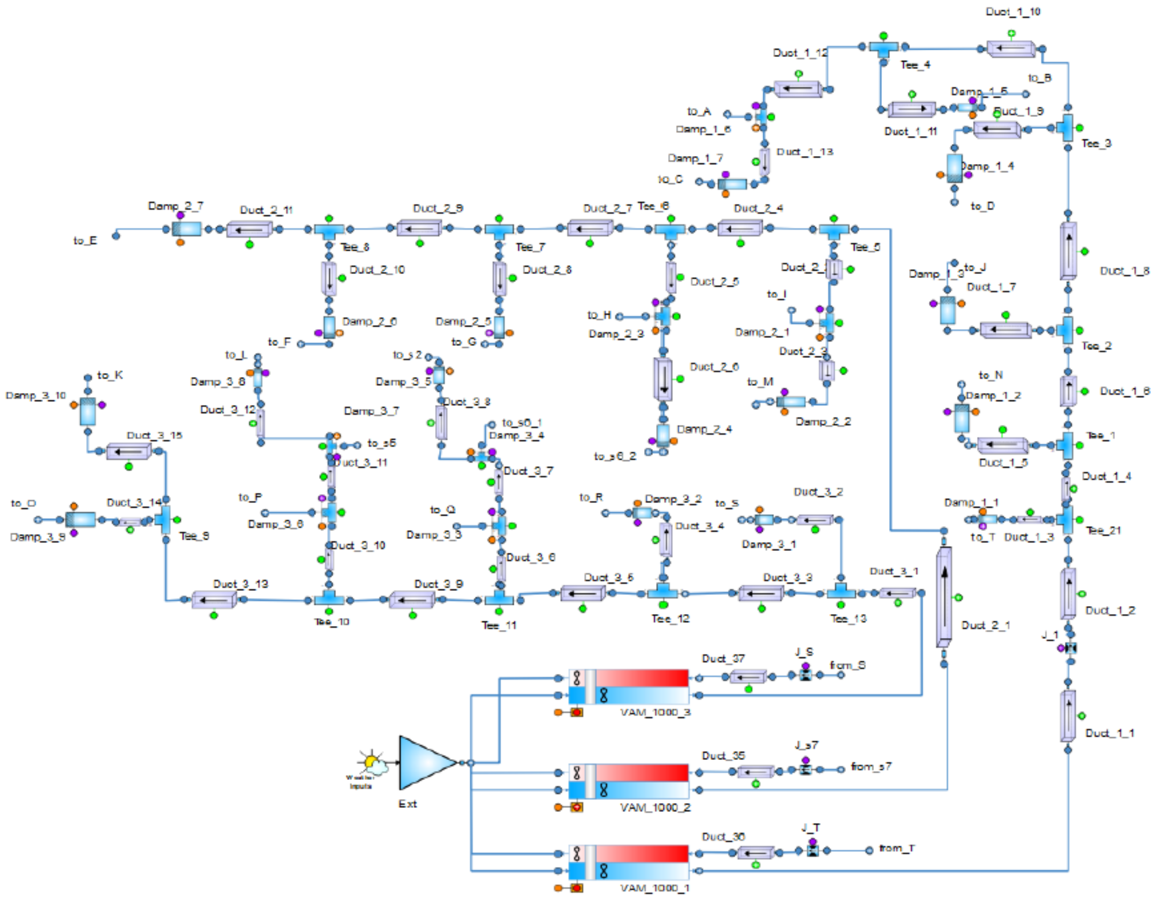
Dynamic PUE level 3-Resilience

Resilience & Failure Scenario Validation

High-fidelity digital twin simulations rapidly assess multiple failure scenarios across critical systems, including redundancy behaviour and control logic response under contingency conditions. At this advanced design stage, the model verifies robustness against events such as power or cooling failures and partial infrastructure outages, enabling mitigation strategies to be integrated directly into the design and ensuring resilience and operational continuity targets are validated before commissioning.

Design Closure Optimization

Final performance tuning once systems are technically defined, refining integrated behaviour across architecture, MEP, power and control strategies before construction-ready definition. This stage validates targets such as energy efficiency, resilience, operability and PUE under realistic conditions, ensuring the solution is fully optimized prior to execution and procurement.



RIBA 5-6 Commissioning Stage

BRIDGING COMMISSIONING TESTING AND OPERATIONAL READINESS THROUGH DIGITAL PERFORMANCE VALIDATION

Commissioning Protocol Definition

Commissioning protocol definition through high-fidelity dynamic simulation of the integrated systems prior to energization, predicting control sequences, expected responses and potential deviations before on-site testing begins. Reduction of commissioning risk, optimization of functional and integrated test planning. Predictive performance baseline against which real system behaviour can be validated

Operational Readiness Training

Operational readiness training by simulating realistic control responses and failure scenarios in a risk-free virtual environment, allowing operators to anticipate system behaviour under normal and contingency conditions. This enables faster familiarization with complex infrastructure, improves decision-making during critical events, and significantly reduces operational risk from day one.

Late-stage Adaptation Assessment

The Digital Twin enables rapid late-stage adaptation assessment by simulating changes in operator requirements after construction, such as revised cooling strategies, rack densities, or IT load profiles. It allows immediate verification of system capacity, resilience margins and required retrofitting, supporting fast, evidence-based design updates without the need to rework the full project baseline.

Performance Verification

The Digital Twin enables performance validation by comparing real-time test measurements with simulated reference scenarios defined during commissioning. This allows rapid detection of deviations from expected behaviour and supports immediate simulation and implementation of corrective actions, ensuring systems achieve their target performance before entering operation.

RIBA 7 Operation and Maintenance

TRANSFORMING LIVE OPERATIONS INTO PREDICTIVE, RESILIENT AND EFFICIENCY-OPTIMIZED PERFORMANCE

Real time Monitoring

Real-time monitoring by continuously collecting data from building sensors and energy meters and comparing actual system behaviour against simulated performance baselines. This allows early detection of deviations, validation of operational efficiency targets, and dynamic adjustment of control strategies to maintain expected performance levels throughout operation.

Predictive Performance Analysis

The Digital Twin enables predictive performance analytics by identifying early signs of system degradation and forecasting efficiency drift based on real-time operational data and simulated behaviour trends. This supports proactive maintenance planning, reduces the risk of unexpected failures, and helps maintain optimal performance and energy efficiency over time.

Closed-Loop Systems Optimization

Closed-loop systems optimization by continuously analysing real operational data and issuing simulation-informed control adjustments to the BMS in response to actual demand conditions. This allows dynamic optimization of system performance, improved energy efficiency, and sustained alignment with target operational KPIs such as PUE under changing load scenarios..

Adaptative Load Management

The Digital Twin enables adaptive load management by dynamically aligning IT demand with infrastructure performance through real-time integration with the BMS. During peak conditions, it can simulate and support controlled adjustments in rack density and load distribution to maintain target PUE levels, avoiding oversizing based on worst-case scenarios. This demand-responsive strategy keeps annual energy consumption significantly lower than conventional peak-PUE design approaches while preserving operational flexibility and efficiency across varying load profiles

Dynamic PUE level 4-Efficiency

Power Strategy

Key Challenges

Power demand increase

Due to AI workloads requirements and rack-density increases

Grid connection resilience

Grid Connection today does not guarantee availability tomorrow

Renewable availability

As renewable targets conflict with 24/7 uptime requirements

Speed to power

On-time energization as a key viability factor

Prices volatility

Due to geopolitical and environmental factors as a key operational risk

Data centers as active participants in Power Systems

Our Energy Strategy

DELIVERING RESILIENT, SCALABLE AND SUSTAINABLE ENERGY INFRASTRUCTURE

Optimized

Dynamic LCOE optimization by multi-source and multi-scenario, simulation based calculations.

Flexible

Multi-source design, including back up generation. Dynamic controls to achieve optimum demand-generation balance

Scalable

Phasing and future growth forecasting. Simulation based scalability analysis

Resilient

Redundant, failure tested, sustainable readiness

EAG

EMPRESARIOS AGRUPADOS • GHESA

FEL -1 Feasibility and Brief

Estimated demand

Compilation and validation of baseline project inputs, including site conditions, climatic profiles and renewable resource time series (TMY), together with preliminary definition of the data center load structure and growth scenarios. These inputs support the development of representative demand curves and operational envelopes, enabling a reliable estimation of annual energy consumption, peak demand requirements and redundancy constraints as a basis for subsequent energy mix optimization..

Energy sources Availability Assessment

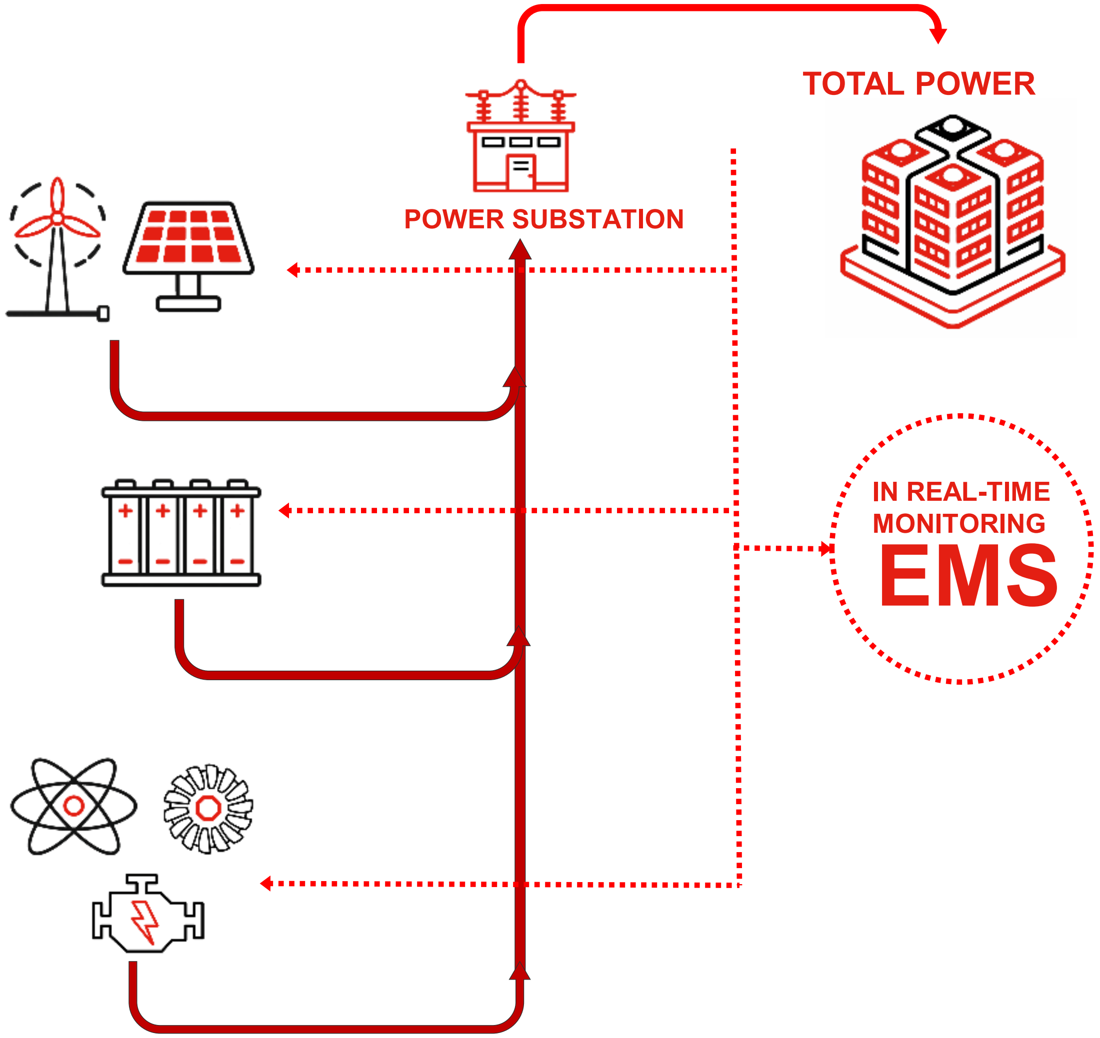
Identification and characterization of available energy supply options, with particular focus on renewable resources and dispatchable backup technologies compatible with an off-grid strategy. The analysis includes evaluation of resource availability, scalability potential, connection constraints, storage integration options and preliminary CAPEX/OPEX benchmarks, allowing definition of technically viable hybrid supply architectures.

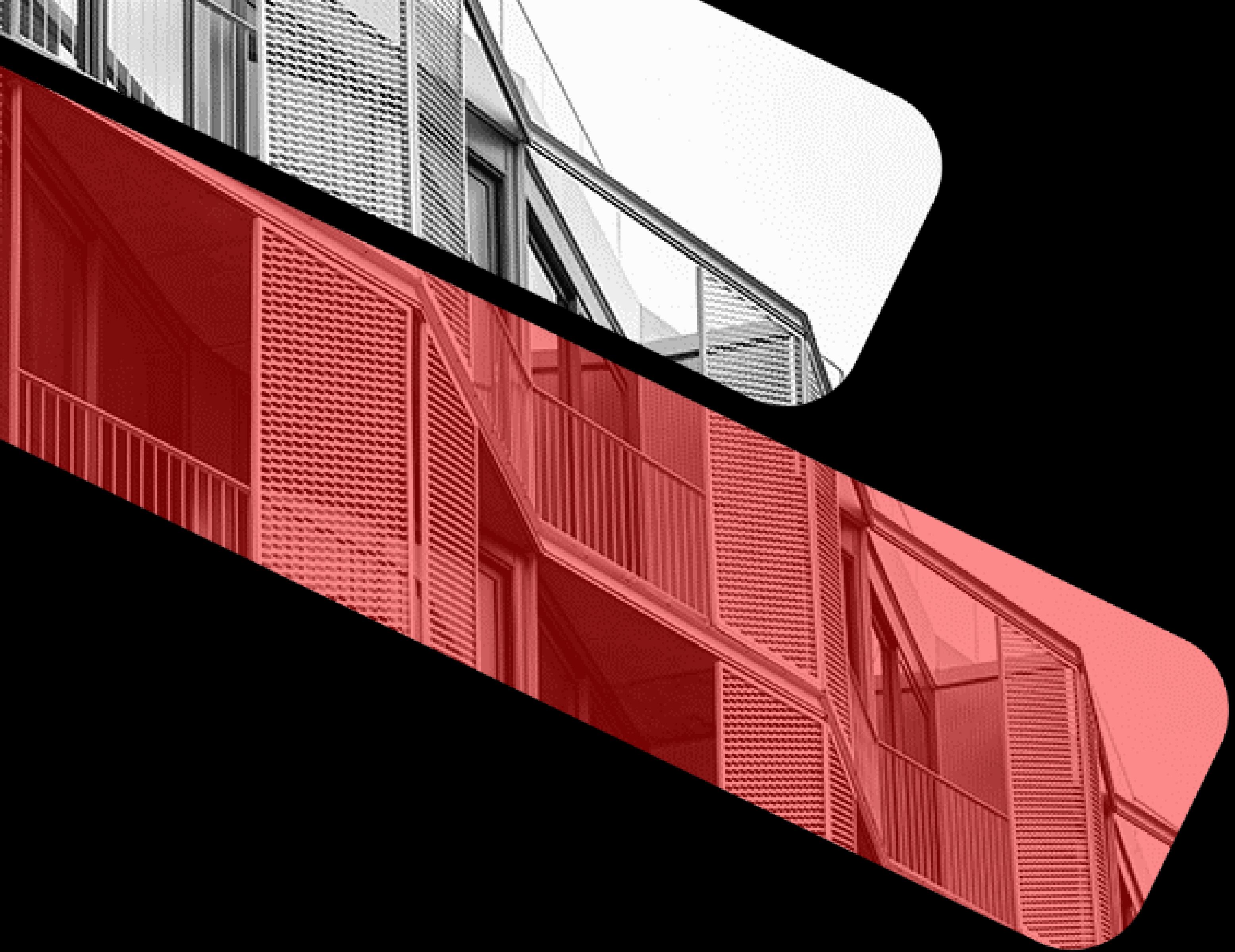
Selection & Optimization. Energy Mix

Simulation of alternative generation and storage configurations through multi-scenario modelling to assess system performance under different demand, climate and operational conditions, incorporating forecast horizons at 12 months, 5 years and 10 years. The analysis evaluates hybrid supply architectures combining grid access strategies, renewable generation, thermal backup solutions and fully off-grid configurations where required, together with backup power technologies such as engines and turbines, hybrid gas-diesel systems, static and dynamic UPS solutions, and KPPs. The resulting technical-economic comparison enables identification of the optimal energy mix in terms of reliability, redundancy, PUE performance and LCOE minimization, establishing a robust basis for the conceptual configuration of the supply system..

FEL-1 report Development

Preparation of the FEL-1 feasibility report consolidating assumptions, modelling methodology, simulation results and recommended supply architecture. The document includes preliminary system configuration, stability and security-of-supply assessment, investment Class IV CAPEX estimates, initial OPEX projections and execution outlook, providing the technical foundation for progressing to the conceptual engineering phase (FEL-2).





THANK YOU

Do you have any questions?
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