DATA CENTERS AND COGENERATION IN SPAIN WORKSHOP

Madrid, February 10, 2026 -- Naturgy

Event Context

COGEN Spain and Naturgy held the *"Data Centers and Cogeneration in Spain Workshop"* with the objective of analyzing the energy, regulatory, and technological challenges associated with the development of data centers in the Spanish context, as well as the available solutions to ensure their efficiency, resilience, and sustainability.

The event brought together representatives from public administrations, energy operators, sector associations, engineering firms, and technology companies, at a time marked by strong growth in digital demand and current limitations in access to the electrical grid at major consumption hubs.

Opening and Welcome

- **Julio Artiñano**, President, COGEN Spain
- **Jesús San Emeterio**, Director of Renewables Spain, Naturgy

Julio Artiñano and Jesús San Emeterio opened the event highlighting the strategic relevance of data centers as demand drivers for the energy system.

Jesús San Emeterio emphasized that, although Spain has high installed electrical capacity relative to its peak demand, this does not necessarily translate into effective availability for new projects due to grid limitations and the location of consumption centers. He also highlighted that data centers require high levels of reliability, redundancy, and supply quality.

For his part, **Julio Artiñano** contextualized the phenomenon on a global scale, noting that data centers currently represent around 1.5% of global electricity consumption and that, according to IEA estimates, they could double to reach close to 945 TWh annually by 2030. He highlighted the role of energy efficiency and cogeneration in particular, which can serve as a bridging technology for the development of data centers toward final solutions integrated with the grid, providing decarbonized and efficient solutions along the way.

Panel 1 | Energy and Regulatory Vision of Data Centers

Moderator: **Fernando Calancha**, Madrid Office Managing Partner, Hogan Lovells

- **Simon Minet**, DG Challoch Energy
- **Francisco Martín García**, Deputy Director General of Energy Transition and Circular Economy, Madrid
- **Lope del Amo**, Head of Energy Transformation and District Heating Department, IDAE
- **Begoña Villacís**, Executive Director Spain DC

- **Raúl Suárez**, Director Gas Networks Spain Nedgia

The panel opened with the presentation of the **Cogen World Coalition and COGEN Europe** study, delivered by **Simon Minett**, titled *"CHP -- A Key Enabling Technology for Ensuring Data Centre Development is Efficient, Cost-Effective and Resilient"*.

- **Simon Minett** presented the global context of data center growth, noting that associated energy demand could range between 800 and 1,000 TWh annually by 2030, driven by AI expansion and increasing thermal density of equipment. He indicated that cooling can represent between 40% and 60% of total consumption in large-scale data centers and that grid connection timelines, typically between 24 and 48 months, are favoring the adoption of on-site generation solutions.
- In this context, he highlighted the role of cogeneration as a solution capable of simultaneously providing electricity and cooling with high efficiency levels, reducing dependence on congested grids and accelerating project commissioning. He also emphasized the potential of waste heat recovery and cogeneration's role as a bridge solution, deployable in shorter timeframes while grid reinforcements materialize.

Subsequently, the debate focused on the energy, regulatory, and strategic vision of data center development in Spain, with special attention to the Community of Madrid and the role of the national energy system.

- **Fernando Calancha** highlighted the paradox between the abundance of industrial, digital, and energy projects and the real difficulty in materializing them due to lack of grid access capacity.
- **Francisco Martín García** highlighted the role of data centers as engines of economic growth, while noting the challenge posed by their high energy and backup needs. In the Community of Madrid, there are 35 operational data centers (216 MW) and over 4,000 MW under processing, with 40% of projects rejected, equivalent to 60% of capacity due to grid limitations. He added that the region demands up to 11 GW of future capacity versus the currently planned 3.8 GW, of which only 2.4 GW are not already allocated (excluding 1.2 GW in Aragon), and that progress is being made in administrative simplification.
- **Lope del Amo** addressed the technological and energy dimension, establishing the foundations of what should be a state-of-the-art data center. He noted that efficiency should govern electronics, cooling systems, location criteria, carbon footprint reduction, and waste heat utilization. He also referenced the processing of the Royal Decree on Energy Efficiency of data centers, which has been submitted for public consultation and, following mandatory procedures, will be published soon, defining the obligations facilities must meet to achieve required efficiency levels.
- **Begoña Villacís** defended the strategic nature of the sector for digital and economic sovereignty, both for the European Union and Spain. She highlighted the country's international connectivity as a fiber optic hub between America and Europe, its high renewable capacity, and the need to attract stable industrial demand. She also referred to difficulties associated with permitting and some requirements of the future energy

efficiency Royal Decree, noting the importance of adequate resolution in its final version and that energy planning considers the specific needs of data centers.

- **Raúl Suárez** presented the advantages of the gas system, noting that Spain has gas infrastructure with excess capacity and that energy transport via gas is 6 to 10 times cheaper than via electricity. He highlighted that hybridization of electricity and gas networks as energy suppliers constitutes an efficient short-term solution and that, in the future, it can serve as backup and arbitrage tool in the electricity market, along with flexible access schemes. He also emphasized the potential of biomethane, estimated at 163 TWh annually, and its role, along with hydrogen, in progressive decarbonization of supply.

The panel concluded by emphasizing the need for coordinated planning among administrations, operators, and developers, as well as hybrid solutions that enable accelerated project development.

Panel 2 | Technical and Energy Solutions

Moderator: **Pablo García Arruga**, VP COGEN Spain (Naturgy)

- **Ricard Vila**, Consulting Director, AESA
- **Carlos Ybarra**, Renewables and Manageability Manager, Sener
- **Mikel Lotina Pereda**, Data Centers Director at IDOM
- **Ángel Valero**, Data Centers Director, Schneider Electric
- **Tomás Alonso**, Director Business Development & Strategy, 2G Energy Iberia

This panel addressed engineering, design, and energy efficiency solutions applied to data centers, as well as the technical and operational criteria that determine their viability.

- **Ricard Vila** presented the technical and operational landscape of data centers from a design perspective, noting that the main challenges associated with these projects are: ensuring efficient cooling, securing primary energy supply and backup (redundancy), and reducing environmental impact.

He highlighted that in Europe, data center power demand could triple by 2030, reaching between 100 and 150 GW. He noted that cooling efficiency (especially liquid cooling) is key to addressing power densities associated with AI, and that increasingly more projects are opting for on-site generation schemes combined with flexible grid access instead of the traditional model of grid connection with diesel backup generators.

He also emphasized the importance of planning equipment end-of-life closure and recycling and the growing interest in sustainability and circularity standards.

- **Carlos Ybarra** presented engineering's role in the conception, design, and execution of data centers, highlighting that main challenges focus on ensuring supply quality, redundancy, and resilience. He explained that currently the approach has evolved from almost exclusive grid dependence toward hybrid solutions combining grid with on-site generation (trigeneration, batteries, renewable sources).

He mentioned cases of off-grid projects or with island operation capability where cogeneration/trigeneration, complemented with photovoltaic and storage systems, enables addressing situations where grid access is not immediate or is limited. He also highlighted that, given the current situation of grid capacity shortage, some developers are considering bridging power solutions to enter operation without waiting for final grid connection.

Finally, he noted that engineering's role is increasingly relevant in integrating sustainability, circularity, waste heat reuse, and preparation for clean fuels (biomethane, hydrogen) criteria.

- **Mikel Lotina Pereda** presented a comprehensive vision on the evolution of data center design, remarking that the sector is transitioning from conservative solutions based on total redundancy toward more efficient and flexible models.

He highlighted AI's impact on increasing thermal densities, increased water consumption associated with liquid cooling (noting cases where water consumption can reach significant values), the need for adequate fiber optic networks to ensure minimum latency times, and the importance of strategic data center location, both regarding connectivity and energy access.

He also noted that large projects are integrating combined energy strategies (renewables, cogeneration, storage) to improve efficiency, reduce operating costs, and ensure service continuity. He also mentioned that some data centers in the U.S. are exploring connection to district heating networks to leverage waste heat.

- **Ángel Valero** presented Schneider Electric's approach to efficiency, digitalization, and sustainability of data centers. He highlighted that most current data centers are designed with improvable efficiency levels and that significant potential exists in optimizing energy management, cooling, and control systems.

He explained that liquid cooling is gaining ground in high-density projects (especially for AI), but noted that its adoption also depends on water supply continuity guarantees. He also indicated that air cooling solutions remain predominant in traditional data centers and that significant room for improvement exists in optimizing these systems.

Finally, he emphasized the importance of digitalization and use of digital twins to improve operational efficiency, reduce costs, and anticipate potential failures, as well as the relevance of advancing in waste heat reuse and renewable solution integration.

- **Tomás Alonso** focused his intervention on cogeneration and trigeneration as efficient and scalable solutions for data centers. He highlighted that these technologies allow simultaneously covering electricity, cooling (through absorption), and heat needs, improving PUE and reducing dependence on electrical grids.

He presented real cases of cogeneration application in data centers in Germany, France, and Ireland, noting that cogeneration enables accelerating project development when the electrical grid is limited, and that it can operate in different modes: base supply, grid complement, or island mode.

He highlighted that modular cogeneration/trigeneration solutions facilitate flexible sizing and gradual scalability as demand grows, and that evolution toward renewable fuels (biomethane, hydrogen) is marking this technology's future development. Finally, he noted that some projects are already incorporating preparation to operate with hydrogen blends, including facilities operating with hydrogen.

He explained that cogeneration/trigeneration allows reducing electrical consumption for cooling through waste heat use for absorption cooling, improving PUE (illustrative example of reduction from 1.3 toward values close to 1.06). He also emphasized the value of modular and granular solutions to reduce redundancies and total cost compared to large units, and mentioned the possibility of integrating CO_2 capture and valorization in industrial applications.

Panel 3 | Generation Solutions: Engines and Turbines

Moderator: **Carlos Giménez**, VP COGEN Spain (Grupo Gimeno)

- **Santiago Carmona**, Sales Manager Iberia, Kohler Power
- **Roberto Camarasa**, Country Manager Iberia, Aggreko
- **Juan Velasco**, Energy Business Development Manager, Wärtsilä Spain
- **Òscar Andreu**, Business Development Manager, Siemens Energy
- **Ignacio Pinedo**, Power Generation (Iberia), Siemens Energy
- **Giovanni Sarti**, Sr Account Manager Data Centre & Grid Stability, Ansaldo Energia

This panel focused on electrical generation solutions through engines and turbines applicable to data centers, including cogeneration, trigeneration, backup generation configurations, and primary power solutions.

- **Santiago Carmona** focused his intervention on solutions with modular gas engines (especially 3--4.5 MW modules) for their start-up capacity and power quality, highlighting that these attributes can reduce needs for additional downstream equipment.

He presented cases in Ireland where system instability and connection restrictions are leading data centers to install gas generation as backup and flexible supply, even replacing traditional diesel-based configurations. He also described the surge in the U.S. of "bridging power": projects built with their own gas power while awaiting grid connection, prioritizing speed of service entry. Finally, he noted that evolution toward cleaner fuels will depend on hydrogen availability and cost, although he highlighted that clients already value preparation for green fuels.

- **Roberto Camarasa** highlighted the shift from the traditional emergency diesel generator model toward solutions where engines cover primary power in the absence of grid. He noted high demand in the U.S. and growth of projects at scales of several hundred MW, with significant supply references in 2025. He also emphasized the need to manage rapid load variations associated with AI and presented "buffer" type solutions to stabilize supply and improve power quality, especially in environments with high *Tier* requirements.

- **Juan Velasco** presented Wärtsilä's offering based on gas and **dual fuel** engines, highlighting modularity, efficiency at partial and full load, low water consumption, and flexible operation capability. He emphasized that some clients consider dual fuel option valuable for fuel-associated redundancy, being able to alternate without needing to stop the engine. He referred to the trend shift toward *off-grid* or extended operation plants, given grid connection times that can reach 5--7 years or more, and noted that a growing part of the sector will evolve toward on-site generation, combined in some cases with

batteries and energy management systems to integrate renewable assets and optimize operation.

- **Òscar Andreu** presented a real case in Ireland based on a set of turbines (configuration with gas turbines and steam turbines), especially highlighting the reduced footprint and ability to configure plants that evolve toward island operation. He emphasized the U.S. market's interest in this type of solution and the possibility of operating with gas or liquid fuel, with preparation for hydrogen blends in the future.
- **Ignacio Pinedo** explained a case linked to the Irish grid operator's response to data center demand growth, presenting an emergency power program based on aeroderivative turbines, with rapid deployment thanks to prefabricated and modular solutions. He highlighted that this type of equipment can be installed in very short timeframes when gas and grid connections exist, and that they incorporate rapid start-up capabilities and flexible operation.

He also mentioned large-scale projects in the U.S. associated with artificial intelligence data centers, where the priority is accelerating operational entry through own power (*bridging power*), maintaining part of that capacity subsequently as backup.

- **Giovanni Sarti** presented a new generation gas turbine in the ~16 MW range, highlighting its simple cycle efficiency, long maintenance intervals, and low emissions. He emphasized the development of capabilities to operate with high hydrogen blends and, in certain cases, with 100% hydrogen, maintaining performance and maintenance plan, as well as evolution toward hydrogen combustion technologies with lower NOx emissions.

Regarding data centers, he highlighted the need for solutions capable of responding to rapid load changes, maintaining high reliability, and facilitating transition toward low-carbon fuels, indicating increased demand for this type of turbines for data center applications.

Panel 4 | Innovation and Sustainability

Moderator: **José Miguel Macho**, VP COGEN Spain Siemens Energy Decarbonization

- **Nuria de Lucas Sánchez**, Energy Transition and Market Intelligence, Naturgy
- **Fernando Bustamante**, ITELCO Business Manager, Enagás

Topics addressed by both speakers were:

- **Nuria de Lucas (Naturgy)** highlighted the role of renewable gases, particularly biomethane, as a relevant lever for decarbonization. She noted biomethane's potential in Spain, estimating it at around 163 TWh, and up to 230 TWh if biogenic CO_2 is considered. However, she warned that biomethane development in Spain remains slow: she mentioned 15 plants in 2024 and 25 in 2025, compared to over 700 in France. In this context, she emphasized the need to promote biomethane through streamlined processing and a cross-cutting regulatory framework, supported by each autonomous community having a defined roadmap. She insisted on the importance of launching demand signals that enable activating investment and accelerating biomethane deployment in the market.

- **Fernando Rodríguez** presented Enagás's role as infrastructure operator also in the digital realm, highlighting that the gas network has fiber optic deployed along its entire route, which allows leveraging existing energy corridors and facilitates rapid and secure deployment of new communication routes. He explained that Enagás, since 2018, has developed a wholesale fiber optic offering through Axent (currently 100% owned by Enagás), consolidating fiber optics as an intrinsic activity to the company's development and also facilitating a capillary connectivity service for both large data centers and smaller facilities.

General Conclusions (by José Miguel Macho)

The event demonstrated that data centers have consolidated as critical infrastructure for economic growth and digital sovereignty, with accelerated growth that is stressing energy systems and grid infrastructure.

Spain has relevant advantages, such as its high renewable capacity, strategic position in connectivity, and gas network, but faces significant challenges associated with effective capacity availability and administrative complexity.

In this context, cogeneration and hybrid on-site generation solutions (engines, cogeneration, and fuel cells) were identified as key tools to reduce timelines, improve resilience, optimize energy efficiency---especially through waste heat utilization---and facilitate progressive project development.

Likewise, the future role of renewable gases, particularly biomethane, for supply decarbonization was highlighted, as well as the gas network's role as support for the fiber optic network being developed to serve data centers.