

S&P Global

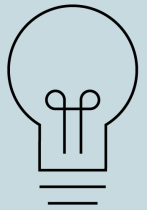
Commodity Insights

CI Consulting

Global Power & Renewables

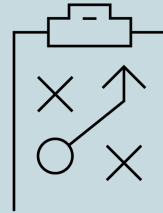


Contents



Industry insight

- Answering the evolving needs of the power sector



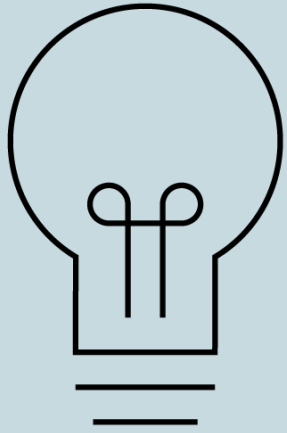
Our solution

- Expertise across the electric sector
- Cross-sector and data-driven perspectives
- Scenario-based, custom market analysis
- Highly locational demand studies
- Coverage of decarbonization, carbon markets, and power-to-X

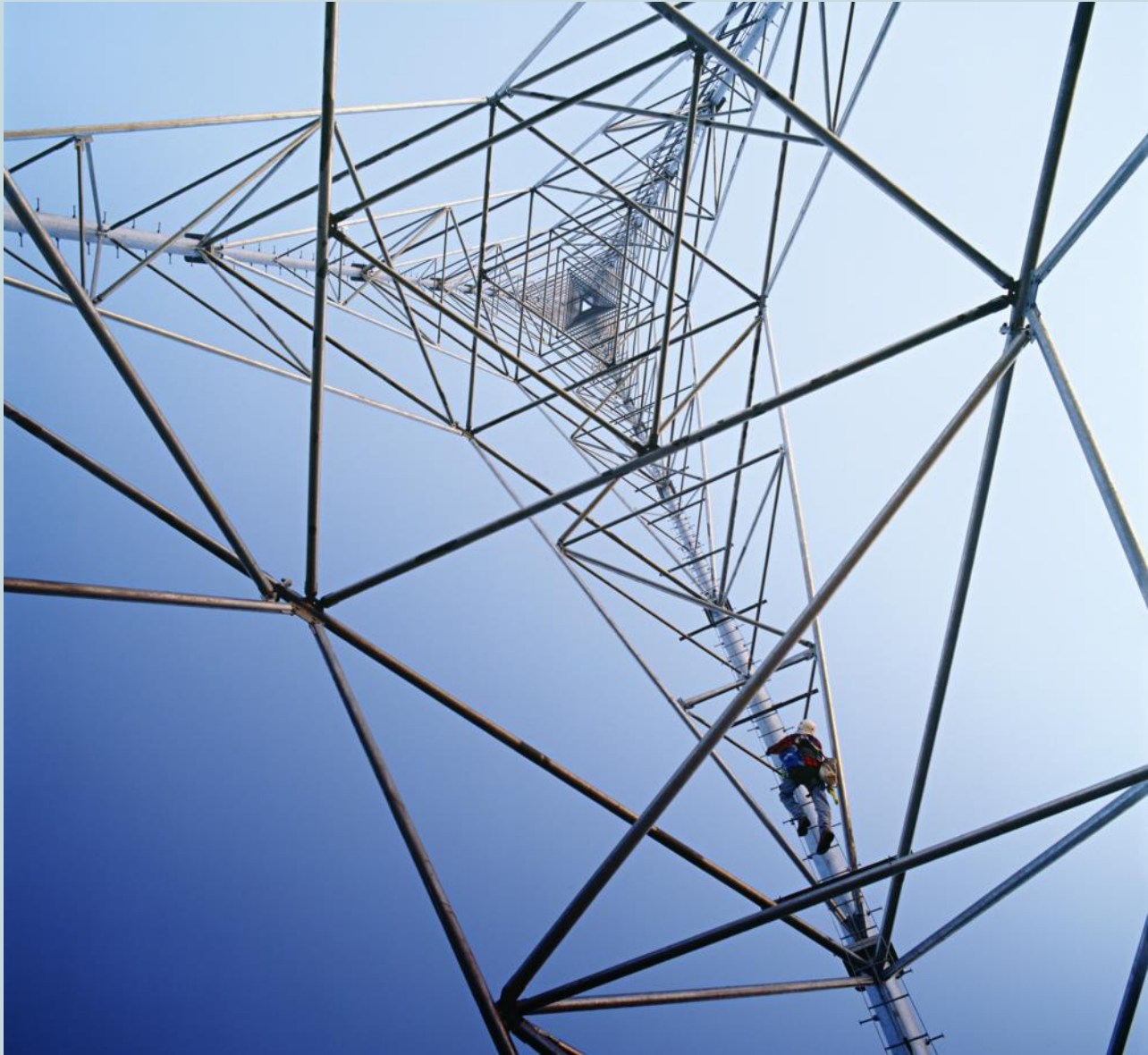


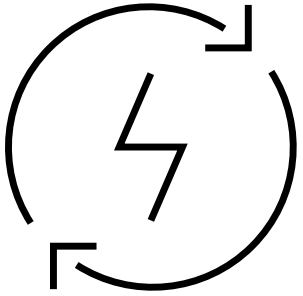
Our impact

- Strategic investment and procurement decisions backed by powerful insight
- Uncovering value creation opportunities
- Evaluating long-term economic viability of projects
- Clients gain confidence in understanding policy and regulatory risks



Industry Insight





The power sector is pivotal to progress.

The power sector is a pivotal force in reducing the world's reliance on fossil fuels. It's powering global progress towards low-carbon energy systems, by integrating renewable energy and electrifying transportation, heating, and industrial processes.

As renewable energy continues to penetrate the grid, the power markets are facing transformative changes. To manage variable energy sources, integrate energy storage, and provide innovative pricing mechanisms and signals, market designs must continually evolve.

However, the journey towards a low-carbon energy future requires strategic regulatory changes and targeted infrastructure investments. This includes implementing policies to make renewable energy deployment easier, streamline project approvals for generation, storage and load interconnection, and modernize the grid. Each step is crucial to efficiently integrate more energy resources at wholesale and distribution levels.

Power sector decarbonization is complex.

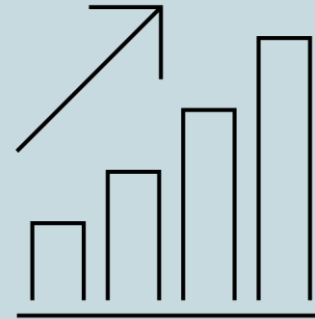
Navigating the power market involves understanding fluctuating demands, rapid tech advancements, non-dispatchable generation sources, and rapidly-evolving regulatory frameworks.

But despite the complexity, there are significant opportunities for both renewable power suppliers and buyers – propelled by technological progress and strong government incentives in many regions.



But where there's reward, there's risk.

Power prices are volatile and can be suppressed during certain hours – making timing of generation important. The long-term economic viability of a project depends on demand growth, fuel prices, wind and solar penetration, the development of energy storage and available durations, and changes to regulations and market design. Being able to successfully assess and manage these risks is key for generators and buyers of renewable power.

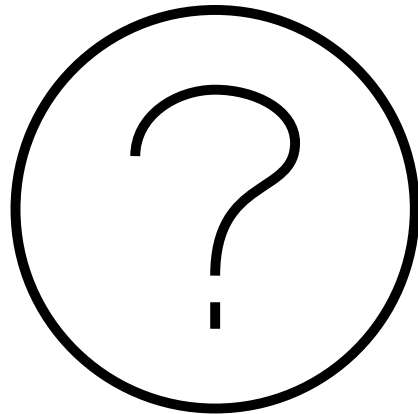


One trend that's unique to the power sector, is the growth of distributed and customer-sited energy resources. These resources can improve adequacy and reliability, but they can also impact price formation, dispatch and system security. Therefore, careful regulatory planning is needed to integrate these resources effectively.

...as a result, you're asking questions that have never been asked before.

Our consulting service provides custom-built intelligence to give you all the answers, help you tackle challenges, seize opportunities and provide insights on critical questions.

Here are some of the questions we've answered for our clients:



How can we assess the optimal placement / location for new gas-fired generation developed for reliability purposes?

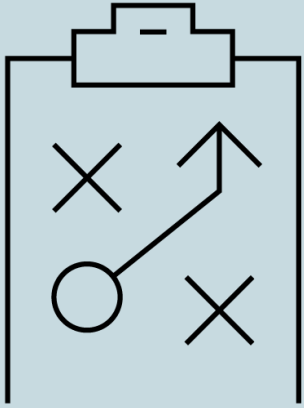
How will the potential explosion in data center development affect a utility's local peak loads, spatially, and therefore transmission and distribution development needs?

How will climate change affect power demand, hydropower generation, etc. and what are the implications for future transmission utilization and power plant development / siting?

How does new generation or new demand affect a power market's marginal CO₂ emissions rate?

How would the production and consumption of hydrogen in the power sector affect long-term power prices?

How should we best design capacity and reliability markets to integrate low-carbon resources?



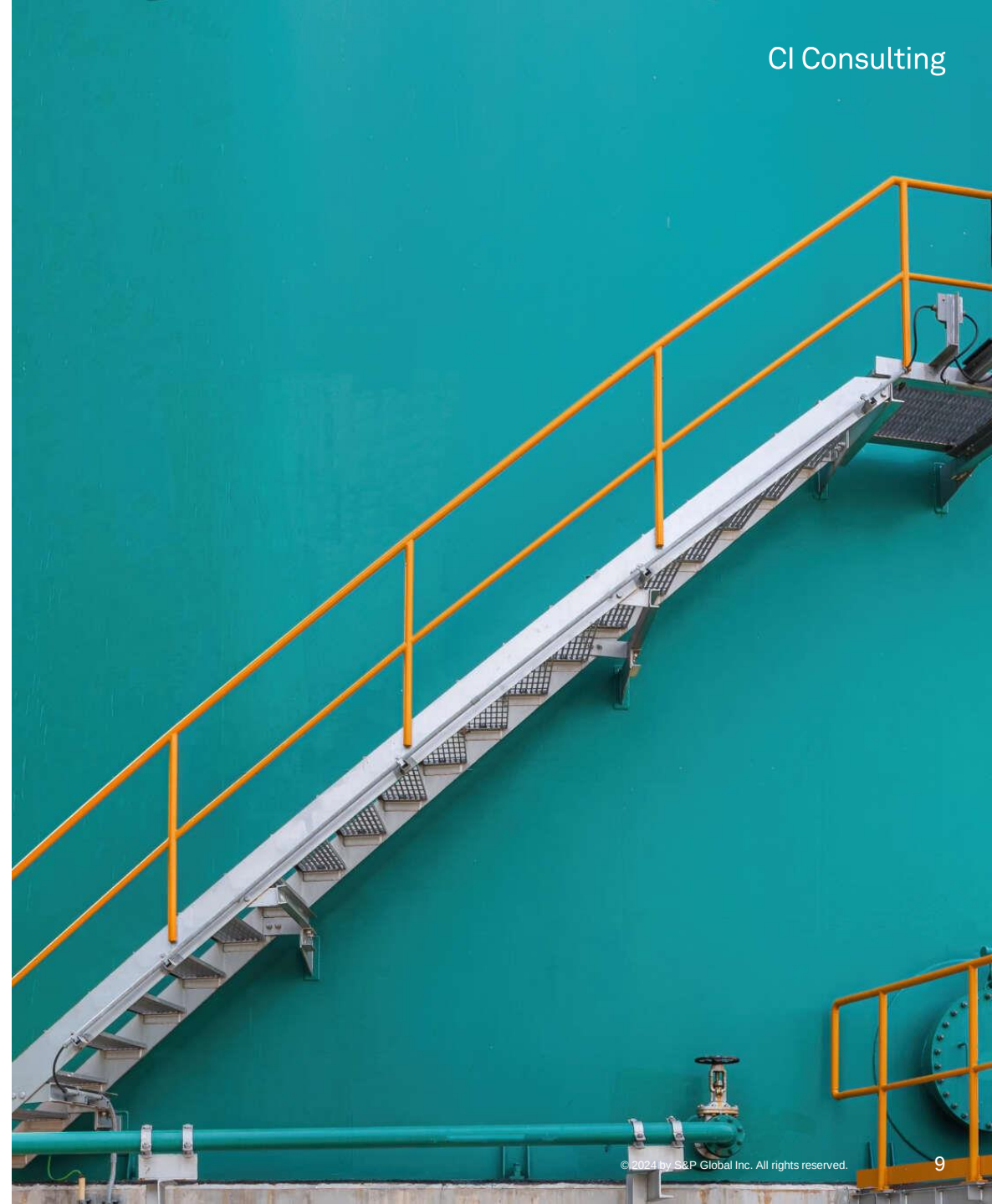
Our solution



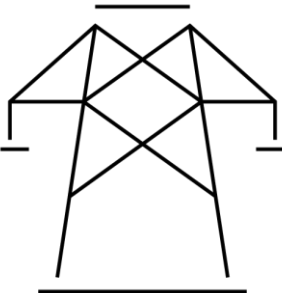
Specialists in power generation.

Power markets are multifaceted, so it's important to understand the full interconnected picture.

Our extensive experience in commercial due diligence of power generators, power market simulation and analysis, combined with our comprehensive expertise across the electric sector – including generation, transmission / distribution, and retail / procurement – enables us to uncover value creation opportunities, evaluate business models and strategies, and assess the competitive landscape for the full spectrum of market participants in the electric sector.

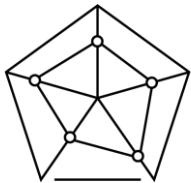


Expertise across the electric sector.

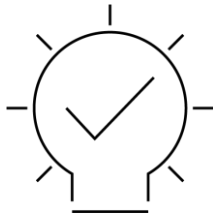
1. Generation	2. Transmission & Distribution	3. Power Procurement and Retail Markets
Key activities: 1. Evaluate generator operations, energy margins, and gross margins in evolving power systems. 2. Quantify resource adequacy revenues and A/S revenues. 3. Assess curtailment risks for renewables or start/stop patterns for thermal generators. 4. Review PPAs, associated risks, and recommend risk mitigants.	Key activities: 1. Assess nodal basis risk and congestion patterns. 2. Evaluate the impact of proposed transmission projects on generator operations and margins. 3. Advise clients on the interplay between transmission system development and generation investment. 4. Quantify the system benefits of proposed transmission lines / solutions. 5. Develop granular and integrated power demand forecasts in support of transmission and distribution planning. 6. Conduct studies for system operators on emerging drivers of power demand such as industrial electrification, data centers, electric vehicles, and behind-the-meter solar.	Key activities: 1. Advise on clean power contracting and hedging. 2. Manage suppliers and evaluate clean power supply offers. 3. Develop decarbonization strategies. 4. Provide market advisory services for retail power markets. 

Make decisions backed by powerful insight.

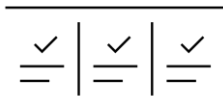
We offer **custom studies, reports, and independent advisory services** to help you navigate the power markets, enabling you to:



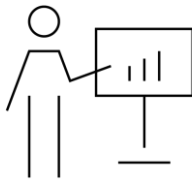
Develop a holistic, scenario-driven view of power markets.



Make informed investment decisions at the project and portfolio levels.



Enter into transactions or develop new projects with confidence, knowing you understand the risks, including how the energy transition will impact power markets and your business’s revenue sources.



Make strategic decisions based on market-leading data, intelligence, and insights, as well as custom, interactive engagements tailored to the unique needs of your organization and management team.

Supply and demand outlooks



Leveraging SPGCI market intelligence and experts to forecast scenario-based country-level or market-level demand growth and power generation profile outlooks

Energy price outlooks

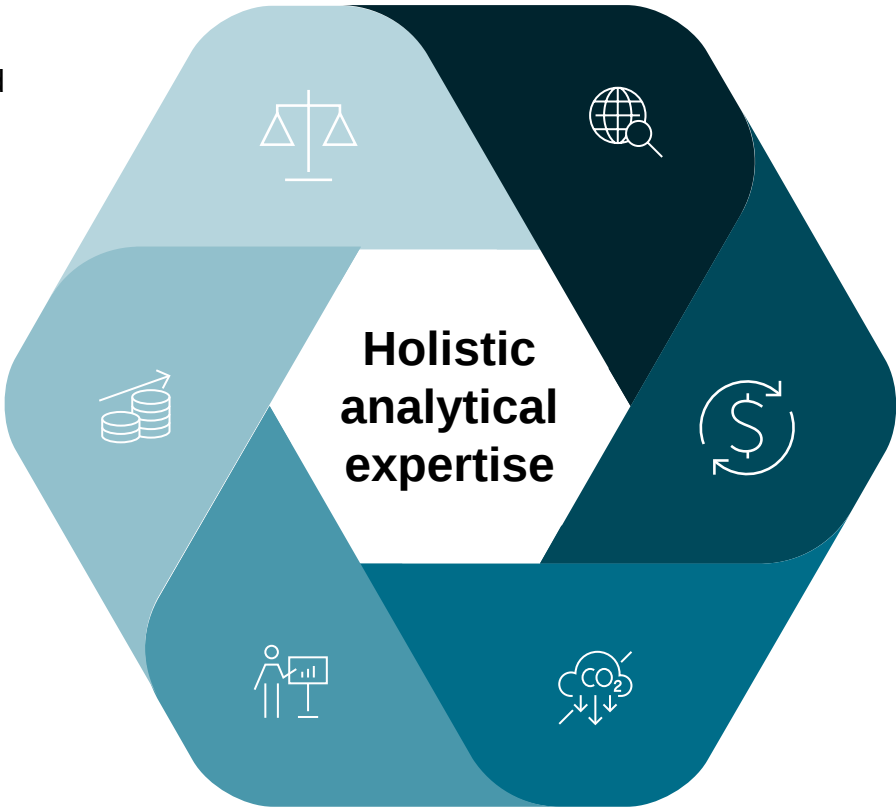


Global coverage of energy markets, costs and manufacturing incorporated in energy price and LCOE outlooks

Regional expertise



Regional expertise with in-depth knowledge in all conventional and future energy markets and power generation



Global country analysis



In-house analysis covering macroeconomic indicators, fiscal backdrop, policy, incentives and markets for economic forecasting, sectoral outlooks and country risk profiling

Transactions



Renewable and conventional asset valuation support for M&A and commercial due diligence leveraging our long-term power market outlooks and custom simulations

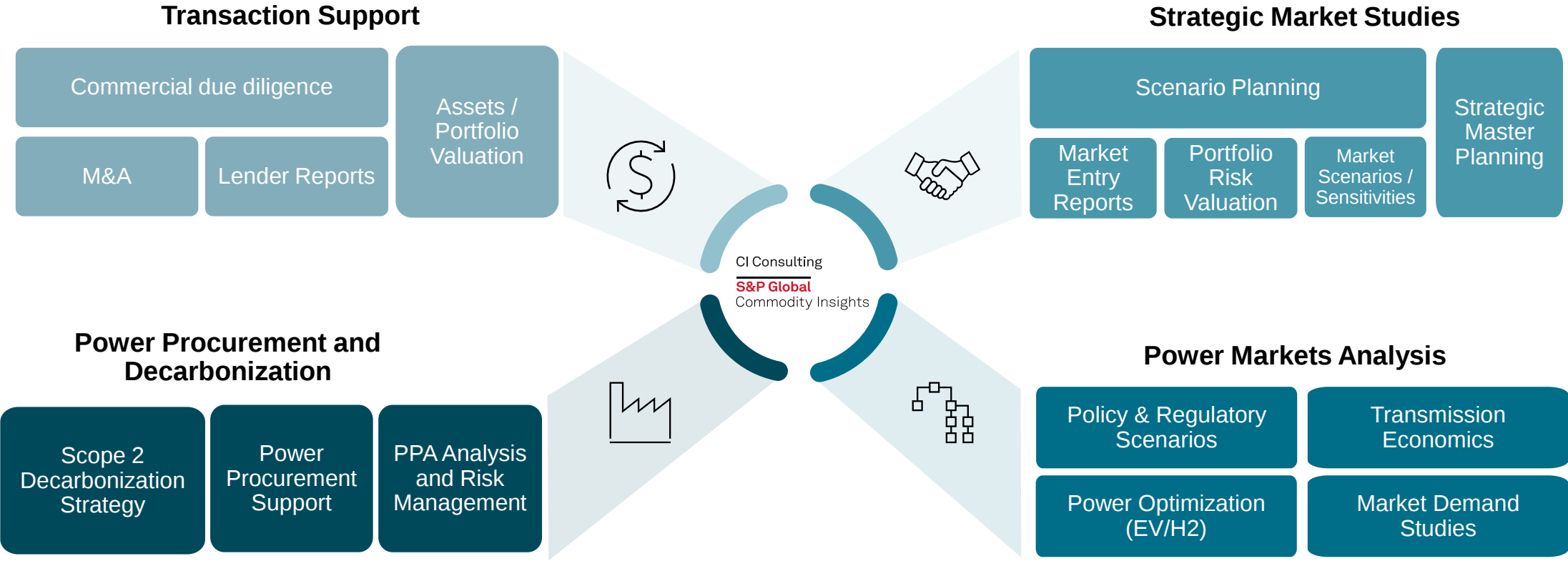
New markets



Wide range of expertise and coverage of carbon markets and power-to-X

Answering the evolving needs of the power sector.

Our expertise covers four core areas: transaction support, strategic market studies, market analysis and decarbonization consultation to businesses aiming to reduce their carbon emissions.



Guided by industry pioneers.

Our consultants are experts in their fields. Their deep understanding and extensive experience helps you navigate the challenges of the power market, transforming data into meaningful insights and actionable solutions.



Barclay Gibbs

Executive Director – Global Head of Power & Renewables Consulting



Chris Wilfong

Director – North American Wholesale Power Markets Consulting



Natallia Pinchuk

Director – North American Power Consulting (Nuclear, DERs, VPPs, Emerging Technologies)



Raul Timponi

Director – Head of Power & Renewables Consulting for Europe, Middle East, and Africa



Guillermo Chavez

Director – Head of Latin America Power & Renewables Consulting



Yufei Su

Head of APAC / China Power & Renewables Consulting



Each power market has different fundamentals, policies, regulations, opportunities, and risks. Gaining a full view of how the electric sector interconnects to fuel markets, rapidly growing computational loads, transportation systems, electric heating, and decarbonization is critical to evaluating strategic decisions and investments.





Our impact



Market assessment and due diligence for utility-scale energy storage

Energy storage system benefits analysis in Long Island (US)

Issue

- A NY based utility was seeking market advisory support for commercial diligence of ten utility-scale energy storage (battery) projects located in Long Island (NY Zone K). The client and its joint venture required a deeper understanding of potential project sites and associated key risks facing their potential storage investments; the client also required a system benefits assessment to support its storage project proposal in response to the RFP.

Our Solution

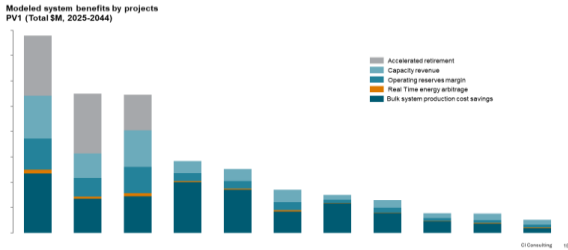
- Modeled energy storage systems according to project specifications e.g., capacity, duration, efficiency, etc. and grid locations to support initial investment committee decisions.
- Calibrated all battery sites under actual market conditions using the model to backcast an historical year.
- Developed long-term (+12 yrs.) nodal energy forecasts and daily spread analyses, under both S&P Global's Planning Case and custom cases defined together with client.
- Explored sensitivities by varying timing of transmission upgrades, Offshore Wind (OSW) buildout assumptions, and zone J/K phase shifter technical parameters.
- Assessed and ranked all sites for system benefits including production cost savings, Offshore Wind (OSW) curtailment reductions, and GHG emission savings.

Impact

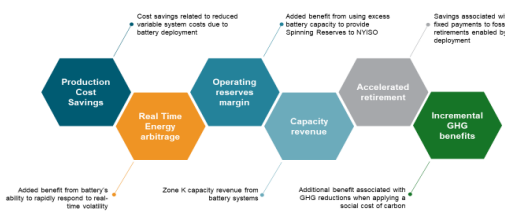
The comprehensive evaluation of battery sites directly supported the client's investment decisions, site choices, and benefits quantification; the accompanying market report provided the private and system benefits for the prospective sites, enabling client to pick and justify the location(s) to include in its competitive RFP response.

Illustrative examples of deliverables

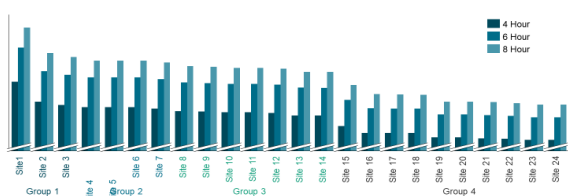
From an absolute system benefits standpoint, projects at these sites deliver the most system value



This section explores drivers of energy storage project benefits across all quantified categories



3-year Total Spreads¹ (2018-2020) by Battery Duration



Note 1: Spread is calculated by comparing the highest 4, 6, or 8 (100%) for each day with the lowest 4, 6, or 8 (100%) for each day (assuming an 80% round trip efficiency).

Industrial Electrification and Decarbonization Potential in Brazil

Market, financial, technical and environmental suitability assessment of electric heat generating and CHP technologies for the industry sector in Brazil.

Issue

- A multinational conglomerate required advisory in the suitability of its clean technology portfolio to decarbonize and electrify the industrial sector in Brazil.
- The client wanted to identify the most promising industry segments, assess financial viability, competitiveness and decarbonization potential applied to each segment.
- The project objectives also included mapping the competitive landscape and the size of the total addressable market.

Our Solution

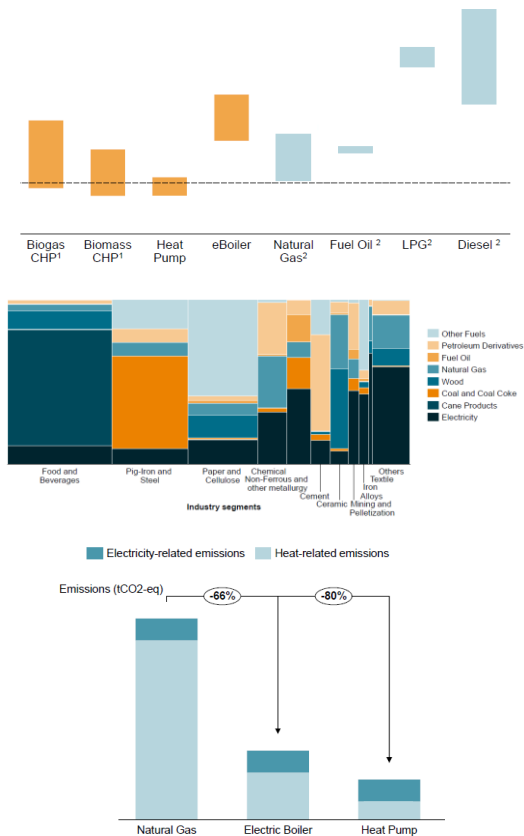
- Shortlisted seven industry segments based on their sub-segment’s process-specific heat requirement, operating temperature, and decarbonization potential.
- Assessed the availability and infrastructure readiness of 4 clean technologies: biomass and biogas CHP, Electric Boilers, and Heat Pumps for each segment.
- Estimated heat and electricity consumption, as well as the CO₂ emissions based on energy and CO₂ emission intensities.
- Assessed the financial viability of the 4 clean technologies in the 7 shortlisted segments.
- Provided a shortlist of target customers and total addressable market size.
- Assessed the competitor landscape in Brazil considering the company’s subsidiaries’ capabilities, for the 4 key technologies of interest, and the 7 shortlisted segments.

Impact

Our results provided the client with a shortlist of the most suitable industrial segments to leverage its clean technology portfolio and a business case for each.

Our insights provided the basis for the client’s decision-making and helped shape their go-to-market strategy.

Illustrative examples of deliverables



Southern African Power Pool (SAPP) strategy assessment for Infrastructure Investor

Technical and commercial fundamentals for SAPP network expansion focusing on selected markets in Sub-Saharan Africa

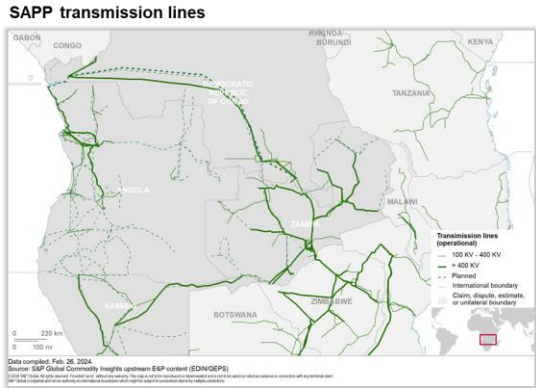
Issue

- S&P Global was commissioned by an Infrastructure Investor to conduct a commercial and technical review in order to identify whether there are opportunities to develop new private interconnectors in the Northern part of the Southern African Power Pool (SAPP).
- S&P Global was requested to provide an overview of the electricity market of the aimed countries, together with an assessment of the prevailing commercial framework within SAPP.

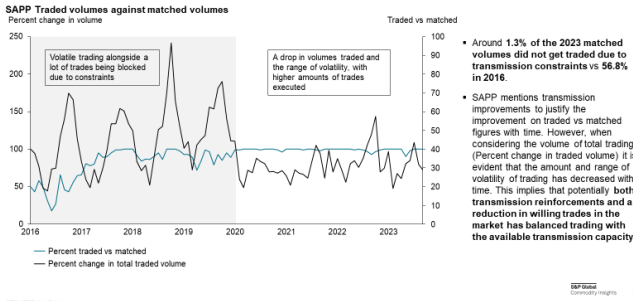
Our Solution

- Analyzed demand, capacity, and generation for selected Sub-Saharan Africa countries up to 2050, supporting insights into export/import opportunities within SAPP for different scenarios.
- Evaluated commercial opportunities for SAPP trading, considering power availability, import costs, and likely import/export routes, identifying potential transmission capacity needs.
- Assessed risks associated with new interconnector development, considering SAPP's evolving trade landscape, liquidity constraints, network planning challenges, and regulatory transparency issues.

Illustrative examples of deliverables



Historically transmission constraints was a big blocker to trading on the SAPP network, this has improved, but partly due to a market calibration, as well as transmission improvement



Renewables Strategy to 2030

Analysis of European countries' attractiveness for renewables and strategic recommendations to achieve 2030 goals

Issue

- A major European Oil & Gas company wanted to get a clear understanding of the countries suitable to invest, develop, and operate renewables in Europe.
- The client required support to elaborate a foreign expansion strategy to achieve its 2030 targets in renewables.

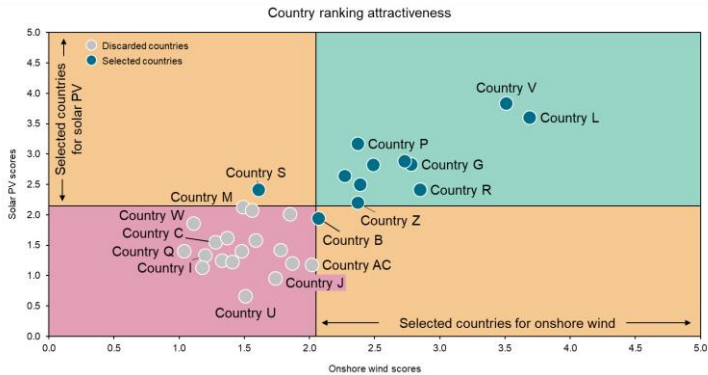
Our Solution

- SPGCI presented a workshop on European Power Markets to introduce the market context to the client's teams.
- SPGCI proposed an assessment based on an industry-proven framework to rank the attractiveness of European markets for investment in renewables, based on 21 parameters and 6 dimensions customized for the client's needs.
- SPGCI prepared detailed country profiles analyzing market fundamentals, regulatory framework, competitive environment, profitability, accommodation, and synergies with the client.

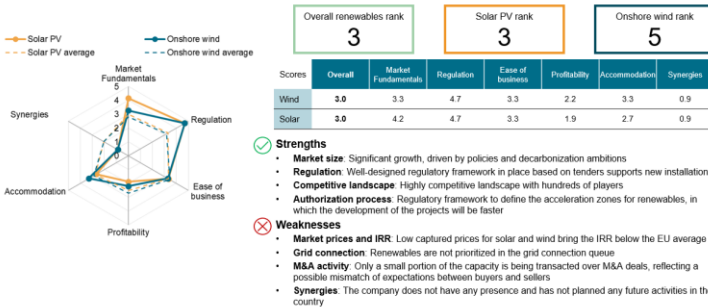
Impact

Our methodology and deliverables allowed the client to quickly compare countries to each other and visualize in detail the output and the assumptions behind the scores for the main countries of interest for the client.

Illustrative examples of deliverables



Country A RES markets is expected to significantly grow, supported by a robust regulatory framework



India green power procurement strategy

Indian state-level power market assessments to 2050, including regulatory analysis and risk assessment

Issue

- A European industrial company targeted a 100% renewable energy procurement for its upcoming facility in India as per the corporate strategy of carbon neutral growth.

Our Solution

- Provided India power market overview including trends in renewable energy, emerging markets, and technology, with a deep-dive into the state of interest to identify strategic procurement opportunities.
- Developed an India LCOE model to assess the current and future cost of generation across different technologies until 2050, aiding in an informed procurement decision-making.
- Conducted detailed India power market modelling using PLEXOS to simulate power system operations, providing an hourly price forecast up to 2035 to optimize procurement strategies based on capacity, fuel, and transmission flow outputs.
- Analyzed and forecasted regulatory charges and regulations (including transmission and open access charges) to assess risks and better compare landed costs.
- Assessed MW requirements for renewable capacity (including storage) based on the demand profile of an industrial facility, generation profile of RE technology, and hourly price forecast. Evaluated realized revenue from market sales to optimize costs.

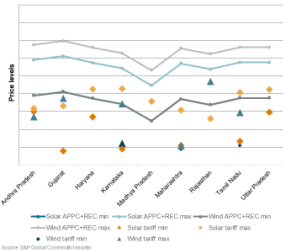
Impact

Our insights helped the client develop an optimal renewable power procurement strategy assessing the market and regulatory risks.

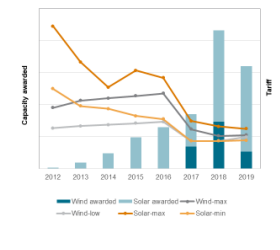
Illustrative examples of deliverables

Corporate renewable PPAs through the group captive, open-access mode attract interest from C&I consumers; however, policy uncertainty is a barrier

Comparison of corporate renewable PPA tariffs with average purchase cost plus renewable energy certificate price

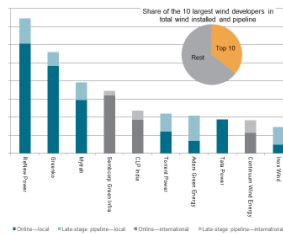


Tender capacity awarded and tariff levels from 2012 to 2019

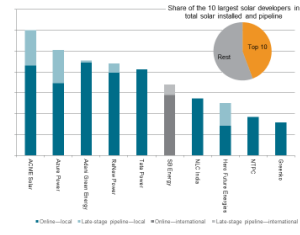


A mix of local and international players is present in the market, led by the local renewable IPPs and diversified utilities

Ten largest onshore wind developers by capacity installed (MW) and pipeline



Ten largest solar developers by capacity installed and pipeline



S&P Global
Commodity Insights

Ready for answers?

Get in touch with us at
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