



# Statement of Qualifications

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## Executive Summary

ZGlobal Inc. is a 100% employee profit-sharing private entity offering a comprehensive suite of services in the energy sector. Our wide-ranging, integrated services assist our clients in navigating the challenges of today's wholesale energy market while factoring in the environmental considerations and the decarbonization of tomorrow's green economy.

Our mission is to deliver end-to-end, integrated solutions leveraging decades of practical experience operating and managing the wholesale energy market and the grid. Our team comprises some of North America's foremost utility operators, engineers, and analysts, essentially amalgamating the engineering mindset, economic insight, and operational proficiencies required to enact the visions of clean energy entrepreneurs.

In 2005, ZGlobal established and strategically positioned its headquarters in Folsom, California, near the California Independent System Operator (CAISO). Notably, many ZGlobal staff members were pivotal in leading the launch of the 1st western U.S. full-scale competitive wholesale electricity market in 1998 within a record of 18 months. ZGlobal Founder and CEO Ziad Alaywan, P.E., spearheaded the inception of CAISO in 1996 while working for the Governor's office and transitioned as the first CAISO employee in 1997 following its formation. Mr. Alaywan's experience prior to CAISO was with Pacific Gas and Electric (PG&E). Over a decade, Mr. Alaywan was a manager of PG&E generation and transmission real-time operation at the utility headquarters dispatch office in San Francisco.

Mr. Alaywan's distinguished educational background, featuring graduate and postgraduate degrees in electrical engineering and mathematics, laid the foundation for attracting several experts to join the firm, leveraging our practical and utility experience. Nearly half of ZGlobal's board members and executive staff were utility employees and members of the CAISO startup team, showcasing our deep roots in the industry.

Beyond its Californian roots, ZGlobal has expanded its footprint into other western states, Texas, and, internationally, into Mexico and Canada, empowering clients with a competitive advantage and reshaping the landscape of new entrants in the ever-evolving electric grid. In addition to its Northern California headquarters, ZGlobal maintains offices in El Centro and San Diego in Southern California and Mexicali, Baja California, Mexico. Our operation centers operate with full redundancy and round-the-clock staffing, orchestrating electricity deliveries on behalf of clients in day-ahead and real-time markets overseen by independent system operators (ISOs) in California and Texas and vertically integrated utilities across the western region.

Our services span from the energy market and analytics to power engineering and real-time operations. These services encompass grid planning, T&D, market analytics, owner's engineering, project development services, and 24x7 operations for emerging technologies.

ZGlobal's clientele includes electricity suppliers, investors, hedge funds, venture capitalists, utilities, water districts, cities, counties, federal and state hydroelectric power, and irrigation districts. These entities require our operation services to ensure compliance with federal and regional regulatory requirements. Clients engage ZGlobal to manage their assets.



Presently, ZGlobal provides operation services and oversees client portfolios comprising over 10 GW of supply and 3 GW of demand in operation, with a transactional value exceeding 5 billion annually. These portfolios cover loads in the Western Electricity Coordinating Council (WECC) and the Electric Reliability Council of Texas (ERCOT). Navigating the intricacies of engaging in an open-market power grid presents substantial challenges.

In addition, ZGlobal consultancy services have spanned over 756 projects since 2005.

In summary, ZGlobal niches are in our ability to recognize the synergy between project engineering, permitting constraints, project finance, and operational realities, which are integral to the success of our client's objectives.

Consultancy Services	Operations Services
<ul style="list-style-type: none"> <li>Grid Planning &amp; Analysis</li> <li>Asset Valuation &amp; Market Analytics</li> <li>Reliability &amp; Regulatory Compliance</li> <li>Merger, Acquisitions &amp; Investment Strategies</li> <li>Expert Witness Services</li> <li>Owner’s Engineering - Infrastructure Development Services:                             <ul style="list-style-type: none"> <li>Project Feasibility &amp; Fatal Flaw</li> <li>Project Entailments</li> <li>Project Engineering</li> <li>Project Implementation</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>Wholesale Electricity Market Services</li> <li>Portfolio Modeling, Risk Management &amp; Optimization</li> <li>24x7 Operations                             <ul style="list-style-type: none"> <li>Short-Term Demand Forecasting</li> <li>Transmission Capacity Allocation &amp; Auction</li> <li>Day-Ahead &amp; Real-Time Energy Scheduling &amp; Bidding</li> </ul> </li> <li>Financial Settlements &amp; Environmental Services</li> <li>ZGlobal Operation System Infrastructure (OSI)</li> </ul>

## ZGlobal Services Volume

Over the past twenty years, ZGlobal's services have spanned 17 states, including Canada and Baja California, Mexico. As a testament to our commitment, 756 projects have been either completed or in development stages, boasting an impressive collective capacity of 134,061 MW of energy.

The tables below illustrate ZGlobal’s Consultancy Services per technology and the annual average volume of ZGlobal Operational Services.





Table 1a: ZGlobal Consultancy Services per Technology

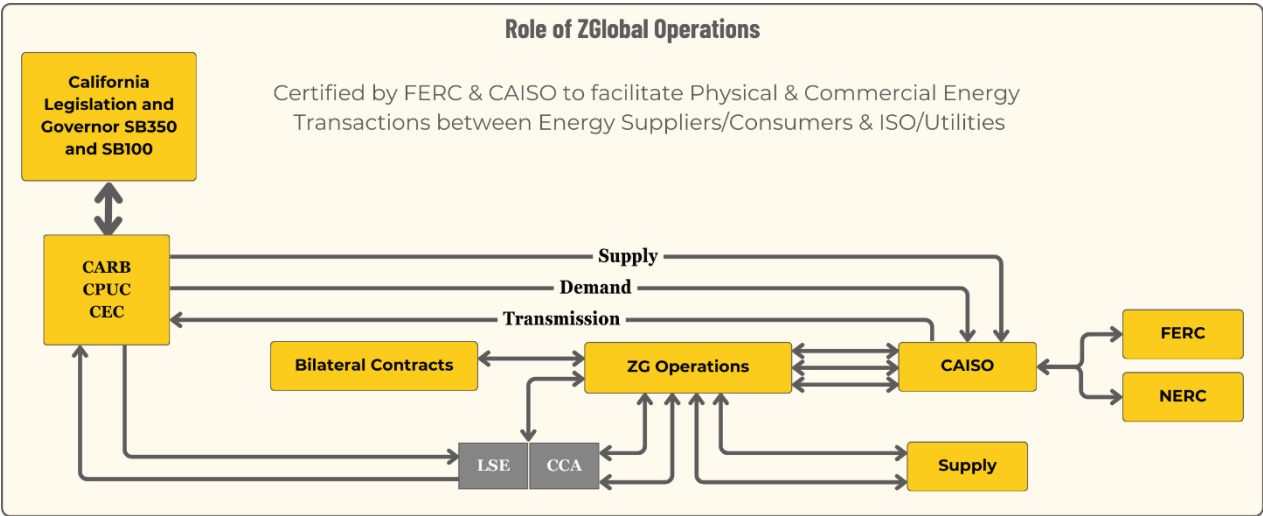
TECHNOLOGY	# of Projects	MW
Switching & Substation	25,015	48
Transmission & Distribution	3,401	36
<b>Total</b>	<b>28,416</b>	<b>84</b>
Natural gas, Biogas, Biomass, Cogeneration & Landfill	23,036	84
Solar	15,508	137
Wind	14,915	71
Hydro	4,824	46
Energy Storage	10,446	83
Hybrid Solar + Storage	27,609	142
Distribution & Microgrid	146	73
Geothermal	1,536	20
<b>Total Generation</b>	<b>97,820</b>	<b>656</b>
<b>Load</b>	<b>7,825</b>	<b>16</b>
<b>Grand Total</b>	<b>134061</b>	<b>756</b>

Table 1b: ZGlobal Operational Services in California, WECC & ERCOT

Service	Annual Average (MWh)
Generation	4,458,858
Demand	17,298,219
Transmission	4,720,583
Carbon	303,475
Congestion Hedge	234,119

## ZGlobal Operation Role

The schematic representation below illustrates ZGlobal's pivotal role as a conduit between clients, encompassing load-serving entities (LSEs), community choice aggregators (CCAs), ISOs, utilities, energy suppliers, and the state and federal regulators. The diagram encapsulates the interconnected wholesale electricity network that ZGlobal expertly navigates, serving as a trusted bridge in the dynamic energy market landscape.



<b>State</b>  <b>SB350:</b> Greenhouse gas target (GHG)  <b>SB100:</b> Zero carbon electricity by 2045  <b>CARB:</b> California Air Resource Board <ul style="list-style-type: none"> <li>• Establish range of GHG</li> </ul> <b>CEC:</b> California Energy Commission <ul style="list-style-type: none"> <li>• Forecast energy demand</li> </ul>	<b>CPUC:</b> California Public Utilities Commission <ul style="list-style-type: none"> <li>• Develop Integrated Resource Plan (IRP)</li> <li>• Approve LSE/CCA supply contracts</li> </ul> <b>Federal</b>  <b>FERC:</b> Federal Energy Regulatory Commission <ul style="list-style-type: none"> <li>• Oversee CAISO, approve wholesale energy rate</li> <li>• Approve transmission rates.</li> </ul>	<b>NERC:</b> North American Reliability Council <ul style="list-style-type: none"> <li>• Oversee grid reliability.</li> </ul> <b>LSE/CCA:</b> Load Serving Entities such as PG&E, SCE, SDG&E, & Community Choice Aggregations procure energy capacity using CEC, CPUC, & CARB targets.  <b>CAISO:</b> Operate the electric grid in 80% of California <ul style="list-style-type: none"> <li>• Operate energy &amp; ancillary market.</li> </ul>	<b>SB100:</b> Zero carbon electricity by 2045  <b>ZGlobal is Certified by FERC &amp; CAISO to:</b> <ul style="list-style-type: none"> <li>• Short-term demand forecast</li> <li>• Submit LSE/CCA/supply hourly schedules &amp; bids to CAISO</li> <li>• Provide transmission</li> <li>• 24/7 operation</li> <li>• Financial settlement between CAISO &amp; LSE/CCA/suppliers</li> </ul>
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## Reliability, Market, & Regulatory Requirements

In the energy sector's intricately regulated landscape, reliability is a major priority, given that the uninterrupted flow of electricity is crucial for public safety and serves as the economy's lifeblood. Rigorous reliability standards necessitate compliance with state, regional, and federal regulations to ensure the secure and stable operation of the bulk power system. These standards encompass critical aspects such as cybersecurity protection and mandates for meeting evolving regulations, which may entail the design of planned additions or modifications to existing transmission or generation facilities.

The North American Electric Reliability Corporation (NERC) reliability standards, along with those established by the Western Electricity Coordinating Council (WECC), the Electric Reliability Council of Texas (ERCOT), and the California Independent System Operator (CAISO), are all regulated by the Federal Energy Regulatory Commission (FERC), as mandated by Section 215 of the Federal Power Act. ZGlobal ensures a comprehensive alignment with the dynamic regulatory environment, fostering a commitment to operational integrity, sound economics, and thorough compliance.

## Who We Are

### ZGlobal History & Expertise

Founded in 2005 as an energy consultancy firm, ZGlobal emerged as a pivotal player in the evolving California energy market. In 2010, we expanded our repertoire to include 24x7 energy management services, branded as "ZG Operations," securing certification as a CAISO Scheduling Coordinator (CSC). This certification empowered us to manage energy delivery round-the-clock for electric consumers across 108 cities and counties, 365 days a year. Our corporate headquarters is strategically located in Folsom, in Northern California, complemented by offices in El Centro, and San Diego in Southern California, and an office in Mexicali, Baja California. The redundancy of our two operations centers enables real-time operations in Folsom and day-ahead functions in El Centro. In 2012, we began offering project owner's engineering and development services combining engineering, permitting, project finance, and operational realities.

ZGlobal is rooted in the deep-seated experience of our staff, particularly in California and western electric utility operations. Many of our team members actively managed the real-time operation of Pacific Gas and Electric (PG&E) transmission and generation in the 1980s and 1990s. In the late 1990s, a large portion of the nation's electricity sector shifted from a vertically integrated, incumbent utility industry to an organized, competitive electricity model, introducing robust competition for electricity.

Many of ZGlobal's staff and advisors, such as Phil Harris, CEO of the country's first regional transmission organization (RTO) (PJM), held critical positions in grid operations and market services at PG&E, IID, and CAISO, forming the bedrock of our diverse and extensive expertise.

Before joining ZGlobal, several staff members had extensive industry roles that exemplified a diverse range of responsibilities.

Below are major accomplishments:

### **1. Market Formation & Operations:**

- Pioneered the establishment of the first organized markets in North America, including the PJM and CAISO markets.
- Orchestrated the implementation of CAISO markets and electric operations. Obtained NERC, FERC, and CPUC certification to combine PG&E, SCE, and SDG&E into a single balancing authority.
- Led the strategic transition of the CAISO market from zonal-based to nodal-based pricing.
- Integrated the Pasadena, Anaheim, and Riverside municipal utilities systems in Southern California into the CAISO.

### **2. Electric Grid Operations:**

- Managed daily electric operation of 42,000 miles of transmission, generation, and interties for PG&E, overseeing approximately 18,000 MWs of peak load.
- Oversaw PG&E real-time hydroelectric energy dispatch, producing approximately 3,900 MW of power.
- Managed daily electric operation of 1,803 miles of transmission, electric distribution of 5,062 miles and generation, for Imperial Irrigation District (IID) overseeing approximately 1,000 MWs of peak load.

### **3. Infrastructure Development:**

- Commissioning of the 1,200 MW Helms hydroelectric pump storage project.
- Played a pivotal engineering role at the Moss Landing Power Plant, a 2,000 MW natural gas-fired facility near Monterey, California.
- Held a senior engineering position at Diablo Canyon, a 2,100 MW nuclear power plant.
- Obtained approval and oversaw the implementation of the "Path 15" 500kV transmission line, linking Northern and Central California.
- Obtained approval and, overall, the implementation of the undersea cable linking San Francisco to East Bay through an undersea DC cable.

### **4. Distribution & Procurement:**

- Managed PG&E and IID distribution centers in San Francisco, San Jose, Fresno, and El Centro in California.
- Managed the upgrades of all PG&E's 115kV underground distribution cables in San Francisco.
- Led PG&E's Energy Procurement Desk after restructuring.



**5. Innovation & System Optimization:**

- Designed and implemented the Hydrothermal Optimization System (HTO), a cornerstone in PG&E's real-time and short-term operational planning.
- Provided leadership in implementing, testing, and migrating the CAISO EMS and SCADA system.

**6. Crisis Response & System Restoration:**

- Led PG&E system restoration efforts following the 1989 earthquake and the blackouts in 1996.

## What We Do

### Energy, Engineering, & Market

- a) Assist clients in developing new Generation, Transmission, and Distribution infrastructure.
- b) Manage the operation of existing assets to transport electricity efficiently from production sites to high-demand areas.

ZGlobal does this while maintaining cost-effectiveness, meeting reliability requirements, and adapting to Mother Nature's dynamic forces. This process involves working with utilities, ISOs, regulatory bodies, suppliers, and customers.

The transmission system is crucial in connecting electricity supply to demand. However, its capacity can be constrained depending on how much electricity it can carry. The geographical location of supply and demand introduces further complexities. The transmission infrastructure traverses state borders and is owned and operated by multiple utilities and different tariffs. Ensuring adequate transmission capacity across numerous authorities is challenging, especially when balancing supply and demand minute-by-minute. For instance, a wind farm in New Mexico supplying electricity to Sacramento must navigate multiple states through three or four transmission systems, each owned by different entities with different tariffs and procedures.

Energy suppliers and generating facilities are often located far away from urban centers with high electricity demand. To address this issue, an extensive multi-state jurisdiction/utility transmission network connects supply and demand. However, electricity availability depends on natural resources, which may only sometimes align with the required quantity. For example, wind and solar generation depend on weather conditions, while hydro generation depends on water availability. Fuel costs and emissions caps can also impact natural gas generation.



## How We Do It

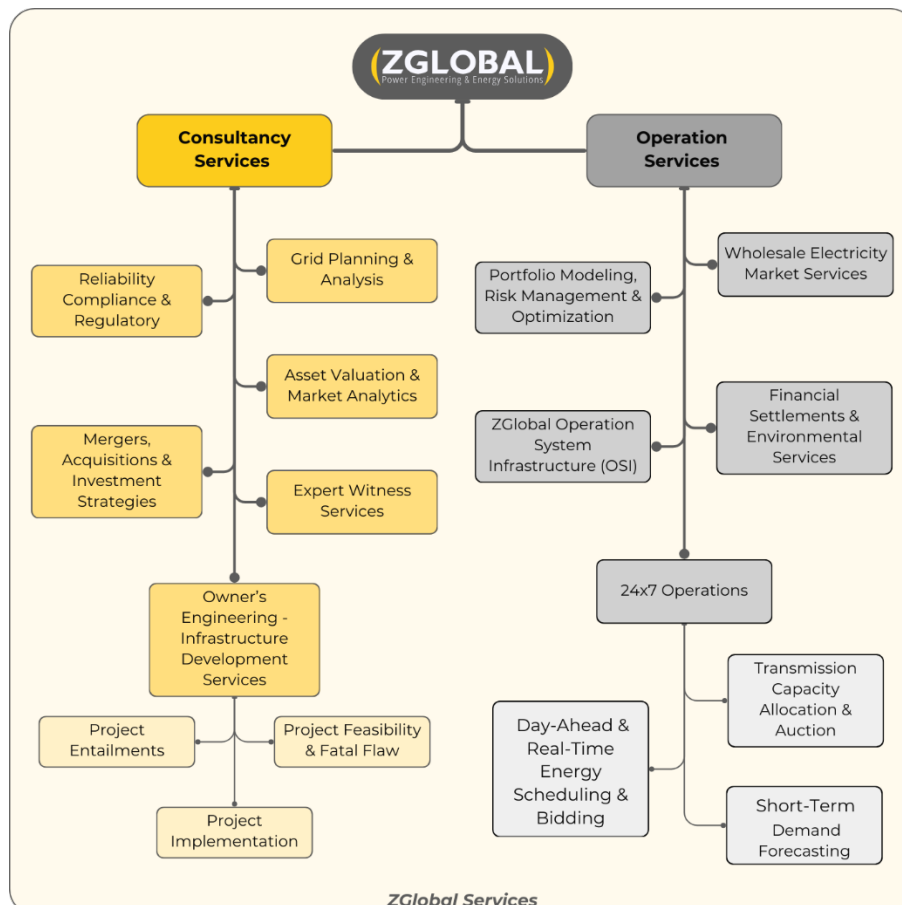
### Summary of Services

In the intricate landscape of today's electricity industry, ZGlobal serves as a critical facilitator, offering consultancy services that drive the transition to renewable energy development and ensure the seamless flow of electricity from generation to consumption. With a team comprising top experts in North America, we bring the mindset of engineers, the insight of economists, and the operational know-how to support the visions of clean energy entrepreneurs.

Today, as climate challenges necessitate the transformation of the bulk power system, requiring substantial investments, ZGlobal guides clients in deploying capital into energy projects that contribute to a cleaner, greener grid. Our focus on sustainability is a commitment and a pathway to building a more resilient electricity sector, delivering long-term value to investors and clients.

Our real-world experiences in project development, market systems, and grid operation uniquely position us to offer a comprehensive range of technical consultancy services. We commit to applying our expertise to making our clients successful, aligning results with the evolving power grid's reliability and economic and environmental needs.

**ZGlobal provides consultancy and operation services covering a broad spectrum of functional areas outlined by the diagram below:**



## ZGlobal Consultancy Services

### Power Engineering Market Services & Grid Planning Analysis

ZGlobal provides comprehensive engineering design and studies for proposed generation, load, or transmission and distribution projects seeking interconnection to the grid or expanding existing connections. These studies serve a dual purpose by assisting clients in assessing the feasibility of potential projects and aligning them with their business objectives and environmental constraints. Our services in this domain include:

- 1. Generation Interconnection Services:** From feasibility and fatal flow studies to in-depth system impact analyses, our offerings cover facility assessments and interconnection agreement facilitation.
- 2. Site Permitting & Regulatory Assessments:** We conduct thorough assessments to navigate the complexities of site permitting and regulatory requirements, ensuring compliance with applicable standards.
- 3. Technology Risks & Equipment Ratings:** Our analysis extends to evaluating technology risks and determining equipment ratings, providing valuable insights for project planning.
- 4. System Protection Coordination:** We offer studies on system protection coordination, addressing aspects such as reactive power, transient analyses, and short circuit analyses.
- 5. Resource & Transmission Planning:** ZGlobal provides expertise in resource and transmission planning, and guides clients through the intricacies of these critical aspects.
- 6. Local Capacity Requirements & Deliverability Analyses:** Our services include assessing local capacity requirements and conducting deliverability analyses to enhance project viability.
- 7. Assessment of System & Local Capacity Requirements:** We evaluate system and local capacity requirements, identifying the need for potential upgrades to ensure reliability.
- 8. Reliability Assurance:** ZGlobal strongly emphasizes reliability assessments, ensuring alignment with federal, state, and regional compliance requirements.
- 9. Detailed Project & Site Design:** Site layout, determine optimum project size, expected generation, and rating. Detailed project design and obtained utilities and regulatory approval considering items 1 to 8.
- 10. Economic Evaluation:** Considering the project's expected electricity output, calculate potential revenues and perform an economic and project cost analysis and project returns.

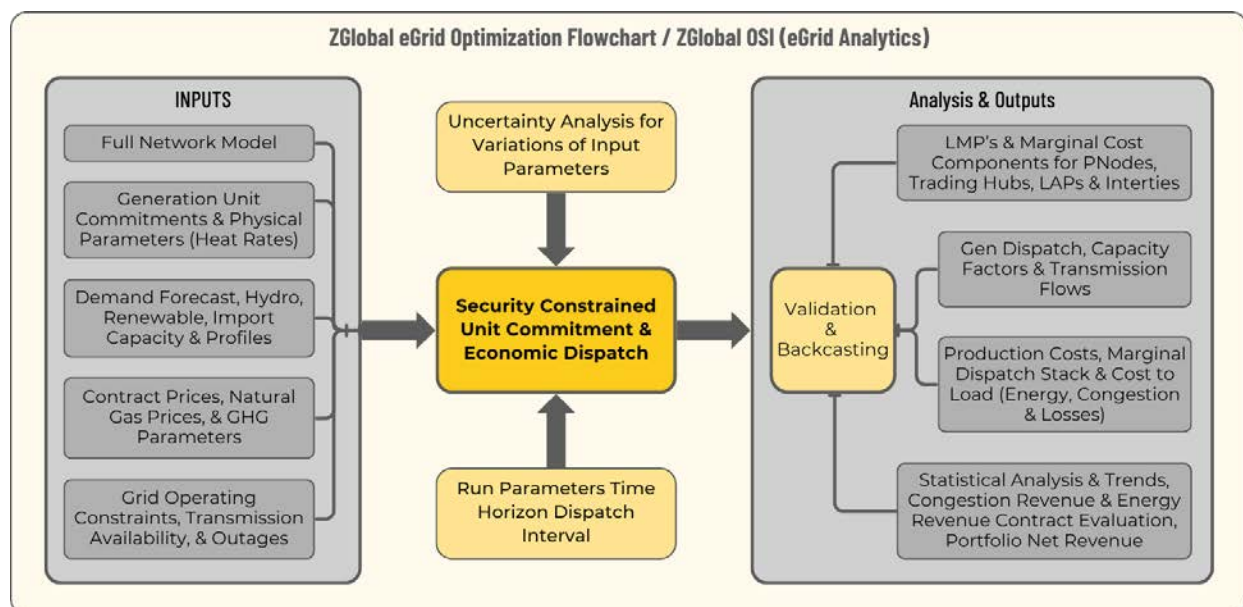
## Asset Valuation & Market Analytics

In the dynamic landscape of North American electricity supply, delivery, and demand, ZGlobal plays a pivotal role in providing asset valuation services that integrate engineering principles with economic realities. Our dedicated team of specialists brings extensive experience in valuing generation, transmission, and distribution assets across various sectors.

### Services:

- 1. Forecasting:** We offer comprehensive forecasts for long-term energy, ancillary services, capacity revenue, and revenue from green and carbon credits.
- 2. Project Finance & Return on Equity:** ZGlobal provides insights into project finance and return on equity, ensuring a thorough understanding of financial implications.
- 3. Revenue & Cost Optimization:** Our expertise extends to optimizing revenue and cost structures to enhance the assets of overall financial performance.
- 4. Cost-Benefit Analysis:** We conduct in-depth cost-benefit analyses to evaluate proposed projects' economic viability and benefits.
- 5. Curtailments & Delivery Analysis:** Our services include analyzing and mitigating curtailments and congestion issues to maximize asset efficiency.
- 6. Bilateral & Power Purchase Agreement Negotiation:** ZGlobal supports clients in bilateral and power purchase agreement (PPA) negotiations.

Valuation of existing and proposed assets involves a life cycle evaluation encompassing cost, revenue, and return on investment. Forecasting projected revenue is critical, especially for projects with fixed income based on FERC-approved rates for transmission assets or bilateral PPAs. Our integrated approach balances project engineering and returns, ensuring alignment between these crucial steps.



ZGlobal's asset valuation services have delivered nearly 2,000 appraisals totaling more than \$15 billion. We utilize hourly dispatch and locational pricing models to assess, forecast, and optimize energy production and costs for generating and transmission assets. Our models, designed for both near-term and long-term assessments, consider numerous factors influencing asset revenue across available markets. Employing deterministic and stochastic approaches, we analyze ways to enhance revenue streams while minimizing capital and operating costs, safeguarding long-term energy project investments.

## Project Finance

Project finance operates on the fundamental principle that lenders extend loans for a project's development based, among other factors, on the project's risks and anticipated future cash flow. This method means lenders for a project typically have limited or no recourse regarding the parent company, also known as the project's sponsor. Project finance involves equity investors contributing a portion of the project's capital cost and securing loans for the remainder. The return on equity investment is significantly influenced by four key drivers: project capital and operating cost, project revenues, tax benefits, and implementation risks.

ZGlobal recognizes that the synergy between project engineering and finance is integral to the success of our client's objectives. Constant interaction between these two disciplines is considered critical. Our approach ensures a thorough understanding and management of the intricate relationship between engineering intricacies and financial dynamics throughout the project lifecycle. This holistic perspective allows us to navigate complexities, optimize financial structures, and mitigate risks effectively, contributing to the overall success of project finance endeavors.

## Portfolio Modeling & Electricity Price Forecast

ZGlobal employs eGrid Analytics to conduct comprehensive portfolio modeling, optimization, and electricity price forecasting. This tool facilitates calculating each grid location's short- and long-term electricity costs, offering valuable insights for effective decision-making.

- 1. Transmission-Based Production Models:** ZGlobal relies on transmission-based production models, also known as deterministic methods, in which assumptions are carefully crafted to satisfy operational, physical, and environmental constraints. These models have been employed for decades, demonstrating their efficacy. The deterministic nature of these models ensures a specific and well-defined set of assumptions, contributing to accurate and reliable forecasts.
- 2. Production Cost Modeling Techniques:** Our approach involves utilizing production cost modeling techniques and optimizing the energy portfolio based on input assumptions. These techniques can be likened to optimization procedures, forecasting the electricity costs necessary to meet specific demand levels. The forecasted electricity costs span hourly projections to a 20-year horizon, providing a robust foundation for strategic planning.

## Production Cost Modeling Techniques

Production cost modeling, employed within the ZGlobal eGrid Analytics framework, encompasses a suite of optimization procedures to anticipate the electricity costs imperative for meeting distinct demand scenarios. These models are characterized by their ability to forecast electricity costs across diverse timeframes, ranging from hourly to a considerable 20-year horizon.

Production cost models, founded on deterministic methodologies, have been the cornerstone of energy forecasting and optimization for several decades. They rely upon a well-defined set of assumptions underpinning the modeling results' accuracy and precision. The deterministic approach primarily comprises the following key components:

- 1. Accurate Generation Modeling:** This entails precisely modeling various generation capabilities, encompassing capacity factors, heat rates, ramp rate variables, incremental costs, startup times, and other pertinent factors. Ensuring the fidelity of these parameters is paramount for accurate electricity cost projections.
- 2. Demand Characteristics:** The comprehensive modeling of demand characteristics forms an essential component of the production cost modeling process. Anticipating fluctuations in demand patterns and their impact on electricity costs is integral to the overall modeling framework.
- 3. Constraint Modeling:** A critical aspect of production cost modeling is the consideration of diverse constraints that govern the energy grid's operation. These constraints encompass transmission limitations, losses, network topology, fuel availability, pollution allowances, rates, and associated costs. Incorporating these constraints into the model ensures that the forecasts remain aware of the real-world operational and environmental factors that influence electricity costs.

Applying ZGlobal eGrid Analytics, underpinned by robust production cost modeling techniques, provides a comprehensive platform for modeling energy portfolios and forecasting electricity prices across diverse temporal horizons. The deterministic approach, relying on accurate generation modeling, demand characterization, and constraint considerations, ensures that the forecasts remain grounded in operational, physical, and environmental constraints. Consequently, this methodology is valuable for energy companies and decision-makers striving to optimize their energy portfolios and make informed, cost-effective decisions within the complex energy landscape.

## ZGlobal's Approach to Optimization & Price Calculation

ZGlobal leverages its expertise and innovative optimization software to determine the optimal hourly electricity supply, transmission, and delivery amount that aligns with client business objectives while adhering to the laws of physics. This process also encompasses identifying the most opportune times for energy storage and determining the optimal release schedule. The outcome of this process is a comprehensive electricity cost forecast (energy, transmission, and losses) at each node of the electric grid and the precise hourly electricity generation amount for each resource that could earn the nodal electricity revenues.



1. **Deterministic Optimization:** ZGlobal employs deterministic optimization to forecast electricity prices at each grid node for each hour based on singular grid and market conditions. However, this method has a limitation, as it does not consider the uncertainties surrounding various grid and market conditions. Relying solely on deterministic pricing while accounting for various grid and market conditions, such as changing fuel costs, weather conditions, or outages, can lead to accuracy in electricity price forecasts. Nevertheless, ZGlobal views the deterministic approach as a dependable baseline for estimating energy pricing, as it elucidates how various generation resources contribute to meeting demand. This energy stack analysis is instrumental in estimating implied heat rates, spark spreads, and marginal electricity costs.
2. **Hybrid Method:** The hybrid method employed by ZGlobal combines deterministic and stochastic models. The deterministic model represents supply and demand relationships based on specific assumptions, while stochastic techniques model the evolution of underlying drivers. This approach aims to discern the factors influencing electricity price fluctuations and identify the primary variables describing these changes robustly and consistently. In the stochastic approach, ZGlobal utilizes the Box & Cox method to transform a set of random variables, each represented by a standard deviation distribution. Notably, the hybrid method excels in capturing and accounting for significant sources of information that reflect the uncertainty associated with events or risks, such as the potential impact of heatwaves or heavy rains and, consequently, fluctuations in electricity prices.
3. **Acknowledging Uncertainty & Risk:** Recognizing uncertainty and risk underscores that there isn't a single anticipated outcome; instead, multiple potential outcomes exist. Decision-making processes must account for a range of values and quantifiable risks. ZGlobal integrates these quantifiable risks into its electricity price forecasts to enhance the management of demand and supply portfolios on behalf of its clients.
4. **Modeling Future Electricity Prices:** The Future Electricity Price (FEP) distribution, centered around the mean, is assumed to follow a normal distribution for each distinct time of the day (periods<sup>1</sup>). This distribution is mathematically expressed as:

$$p(x) = \frac{1}{\sigma 2\pi} \exp\left(-\frac{(x - \mu)^2}{2\sigma^2}\right)$$

- $\mu$  represents the mean of the FEP, calculated through deterministic optimization.
- $\sigma$  signifies the standard deviation characterizing the distribution of the FEP, derived from deterministic analysis.
- $P(x)$  stands for the random probability density variable, a product of the stochastic analysis.

<sup>1</sup> Time of the day periods are: Solar Hours: April to Oct: 7am - 7pm (HE 8-20); Nov to March: 8am to 5pm (HE 9-18) & Non-Solar hours April to Oct: 8pm - 6am (HE 21-7); Nov to March 5pm to 7 am (HE 18-8)

## Reliability & Regulatory Compliance

Our reliability and regulatory compliance services reflect ZGlobal's commitment to excellence. We assist clients in adhering to stringent NERC reliability standards in the operational phase. Projects must satisfy multiple standards, and updated power flow and dynamic models must be provided to reflect the current state of these units. This meticulous approach ensures regulatory compliance and establishes projects as dependable resources within the grid.

## Mergers, Acquisitions & Investment Strategies

In corporate expansion and strategic alliances, ZGlobal distinguishes itself by offering comprehensive consultancy services tailored for entities seeking to invest or partake in the dynamic energy markets. Our expertise in merger and acquisition services is particularly noteworthy, focusing exclusively on the energy industry. We specialize in facilitating acquisitions of diverse energy projects, encompassing photovoltaic solar, wind, gas plants, battery energy storage, geothermal, biomass, hydroelectric and pump storage, and more. This service is designed for clients seeking to acquire energy from existing projects or projects in various stages of development. Our adept team assists clients in unraveling the financial and engineering intricacies associated with energy projects. We gain insights into project viability by meticulously analyzing revenue streams, including energy sales revenue, ancillary services sales revenue, resource adequacy capacity revenue, and renewable energy credits (RECs) revenue. Simultaneously, we identify essential expenses such as CAPEX and OPEX, enabling us to gauge potential rates of return and quantify the risk. Our advisory extends to recommending minimizing the risks associated with critical agreements.

## Expert Witness

At ZGlobal, our dynamic team, comprising consultants, engineers, and market experts, boasts a wealth of services and comprehensive expertise. We provide scientific and fact-based analyses with clarity, timeliness, and professionalism. Most of our staff command a longstanding industry reputation, instilling in our clients a sense of certainty and clarity in navigating complex legal cases.

- 3. Assessing Technical Aspects:** Our team excels in evaluating the technical facets of legal cases through thorough research and meticulous documentation of facts.
- 4. Trial Preparation Assistance:** We extend our expertise to trial preparation, offering additional education on forensic reporting, analysis, and fact findings.
- 5. Mediation Services:** Natural collaborators and the ZGlobal staff seamlessly interact with all involved parties, fostering cooperation and communication. This ability proves invaluable in mediation scenarios.
- 6. Legal Case Involvements:**
  - Imperial Irrigation District v. California Independent System Operator Corporation: ZGlobal provided testimony on transmission operation on behalf of the Imperial Irrigation District, influencing the case's outcome.

- California Attorney General v. Enron: ZGlobal played a crucial role by providing testimony to the California Attorney General, leading to settlements totaling \$1.52 billion. These settlements resolved market manipulation allegations and price gouging claims during the Energy Crisis of 2000-01, providing significant relief to ratepayers.
- San Diego Gas & Electric Company v. Sellers of Energy: ZGlobal testified in federal court regarding widespread market manipulation in California's wholesale markets. This testimony contributed to settlements between the State of California and power suppliers, resulting in a \$750 million settlement.

**7. Extensive Legal Experience:** ZGlobal has offered written and expert witness testimony in over 53 cases across federal, state, and other jurisdictions. Our track record is available for review at our website, showcasing the depth of our involvement and contributions in various legal contexts.

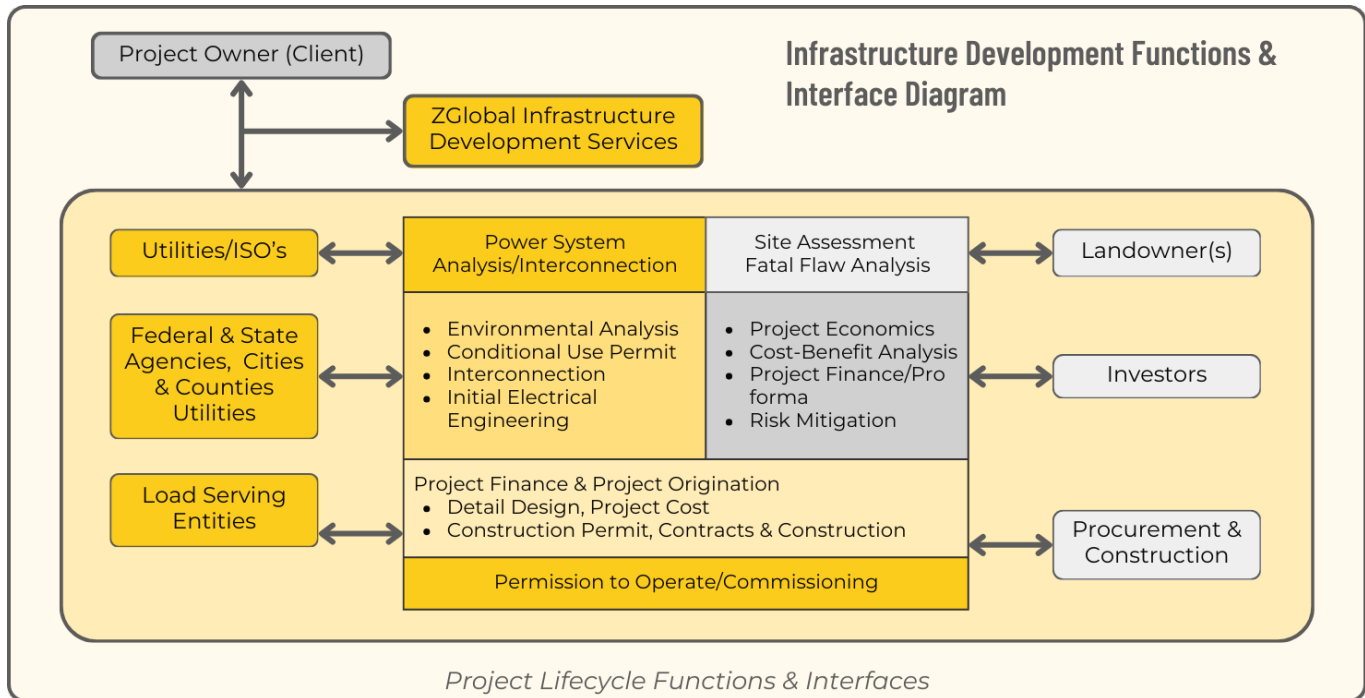
**For list of completed projects:** [www.zglobal.biz](http://www.zglobal.biz)

## Owner's Engineering - Infrastructure Development Services

### Turnkey Development Services

ZGlobal's comprehensive service offering and capabilities encompass the entire spectrum of infrastructure development, offering turnkey solutions from conceptual designs to delivering construction-ready designs and operations for generation, distribution, and transmission projects. Our services span the entire project lifecycle, covering project inspections, site selection, feasibility and fatal flaw analyses, interconnection assessments, environmental analysis, design, permitting, and project finance. We conduct cost-benefit analyses, return on investment assessments, and robust risk evaluations.

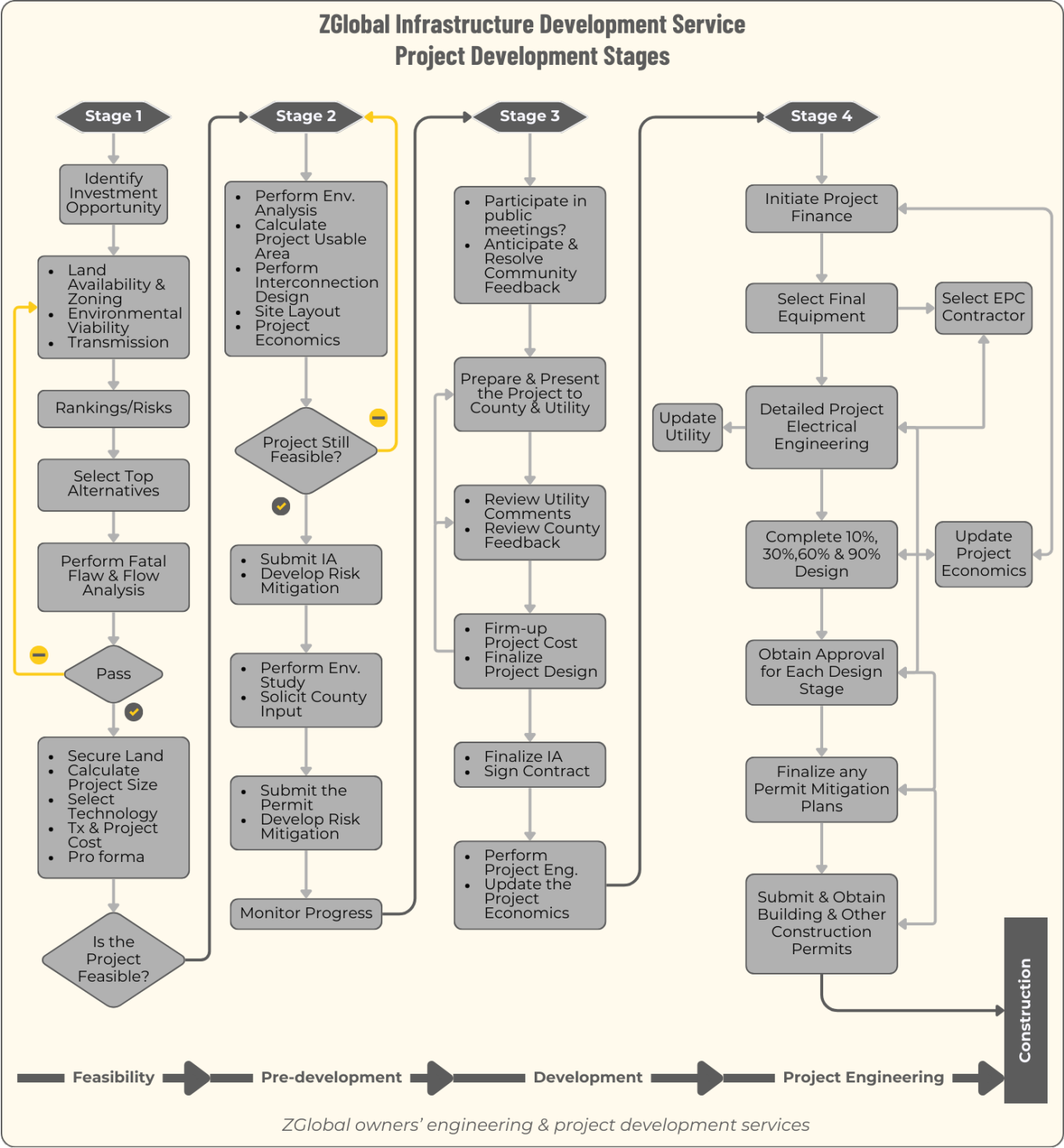
Our engagement extends beyond project design and development as an owner's engineer, as well as project origination and operation. We actively interface with critical stakeholders, including utilities, ISOs, local governmental agencies, state and federal bodies, and financial institutions. This multifaceted approach ensures that projects are designed for optimal functionality and align with regulatory requirements, environmental considerations, and financial and engineering viability. We provide a feasible project schedule and manage the project cost across the spectrum to meet the project's bottom line. The figure below illustrates the diverse functions and interfaces crucial for achieving project objectives seamlessly, from project initiation to completion.



## Project Development Stages

In adherence to a systematic and milestone-driven approach, ZGlobal employs four distinct stages throughout the project development cycle. Each stage marks a pivotal point requiring specific decisions and capital investments. This strategic framework enables optimal resource utilization, capital efficiency, and early risk mitigation.

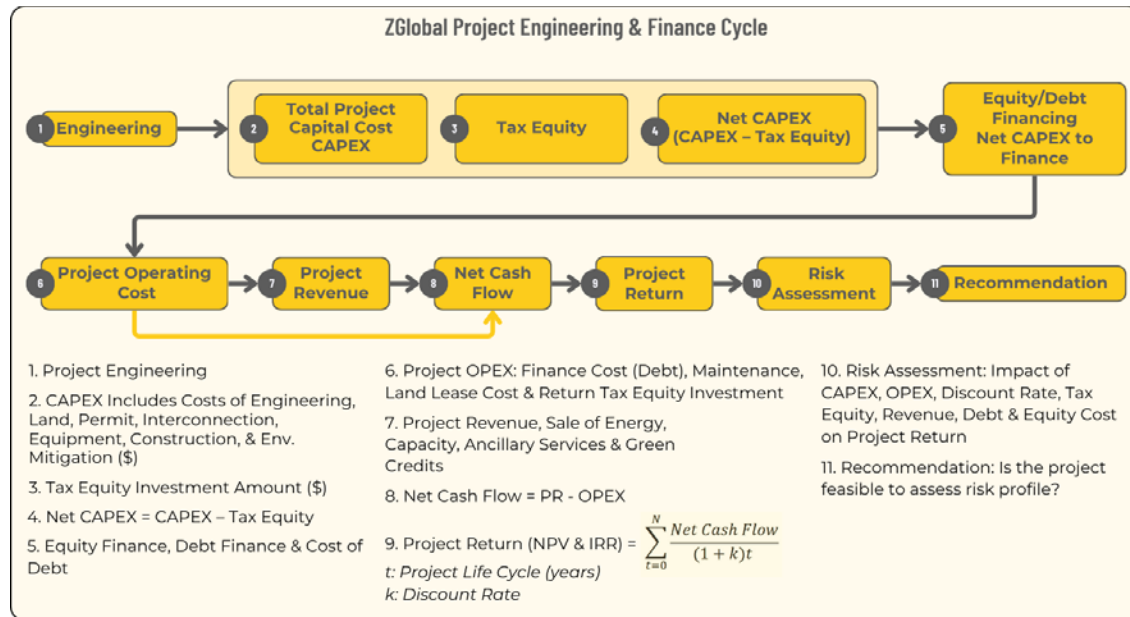
The four stages of the project development cycle are illustrated in the figure below:





## Project Engineering & Finance

ZGlobal recognizes the symbiotic relationship between project engineering and financing, emphasizing that interdependence is pivotal for achieving successful outcomes. A harmonized effort to optimize across these disciplines becomes instrumental in maximizing returns while concurrently minimizing both capital and operating costs throughout the project lifecycle. At every stage of project development, engineering decisions undergo a thorough evaluation to assess their impact on project financing. The chart below illustrates a typical project engineering and finance cycle during development.



<ol style="list-style-type: none"> <li>1. Project Engineering</li> <li>2. CAPEX Includes Costs of Engineering, Land, Permit, Interconnection, Equipment, Construction, &amp; Env. Mitigation (\$)</li> <li>3. Tax Equity Investment Amount (\$)</li> <li>4. Net CAPEX = CAPEX - Tax Equity</li> <li>5. Equity Finance, Debt Finance &amp; Cost of Debt demand</li> </ol>	<ol style="list-style-type: none"> <li>6. Project OPEX: Finance Cost (Debt), Maintenance, Land Lease Cost &amp; Return Tax Equity Investment</li> <li>7. Project Revenue, Sale of Energy, Capacity, Ancillary Services &amp; Green Credits</li> <li>8. Net Cash Flow = PR - OPEX</li> <li>9. Project Return (NPV &amp; IRR):  <math display="block">= \sum_{t=0}^N \frac{Net\ Cash\ Flow}{(1+k)^t}</math> <ul style="list-style-type: none"> <li>• t: Project Life Cycle (years)</li> <li>• k: Discount Rate</li> </ul> </li> </ol>	<ol style="list-style-type: none"> <li>10. Risk Assessment: Impact of CAPEX, OPEX, Discount Rate, Tax Equity, Revenue, Debt &amp; Equity Cost on Project Return</li> <li>11. Recommendation: Is the project feasible to assess risk profile?</li> </ol>
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## Infrastructure Development Timelines

### Stage 1 – Feasibility:

1. Conduct a comprehensive analysis to identify any fatal flaws that may impede project success.
2. Evaluate the suitability of the land, conduct environmental screenings, and assess grid interconnectivity options.
3. Rank potential sites, select appropriate technologies, and estimate production capacity.
4. Develop an initial layout, estimate production metrics and project revenues, and evaluate project finance options.

### Stage 2 – Pre-development:

1. Begin the process of acquiring necessary land and right-of-way agreements.
2. Address zoning requirements, conduct environmental studies, and implement mitigation measures.
3. Engage in electrical engineering and secure conditional use permits.
4. Develop initial project electrical engineering plans, optimize site layout, determine project size, and analyze costs and benefits.
5. Design the interconnection, submit applications, conduct or review system impact and facility studies, and negotiate transmission wheeling and interconnection agreements.

### Stage 3 – Development & Project Engineering:

1. Refine production models based on detailed engineering parameters.
2. Determine optimal project size and analyze hourly production metrics.
3. Optimize energy storage, engage in detailed electrical engineering, perform value electrical engineering, and design site plans, substations, and interconnection points.
4. Prepare 30%, 60%, and 90% detailed electrical engineering design packages.
5. Facilitate project origination and secure long-term offtake contracts. Quantify the value of energy, ancillary services, capacity, and RECs and prepare a bidding package.
6. Specify detailed project costs, manage procurement processes, and finalize contracts.
7. Conduct comprehensive risk assessments to identify and mitigate potential challenges.
8. Coordinate with the Client's EPC contractor.
9. Obtain utility approval.

### Stage 4 – Project Finance Assistance

Collaborating with our clients and vendors, ZGlobal provides indicative project capital and operating costs for the plant and high voltage to ensure the project adheres to the permitting and interconnection agreements. We also develop specifications for significant equipment and obtain initial project costs. We perform initial project finance and proforma. We assist in project origination and develop a bidding package to obtain a long-term PPA.

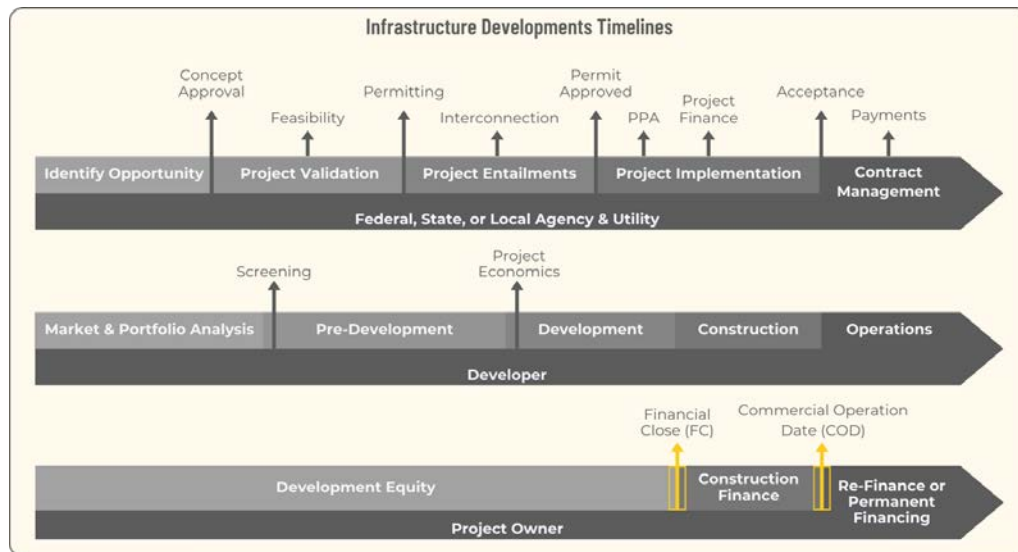
### Stage 5 – Construction:

1. Commence project construction, adhering to schedules and securing necessary permits.
2. Manage project schedules and secure building and construction permits.
3. Implement mitigation plans to address any unforeseen issues.
4. Coordinate with utilities, ISOs, and government agencies throughout the construction phase.
5. Execute contracts related to construction activities.



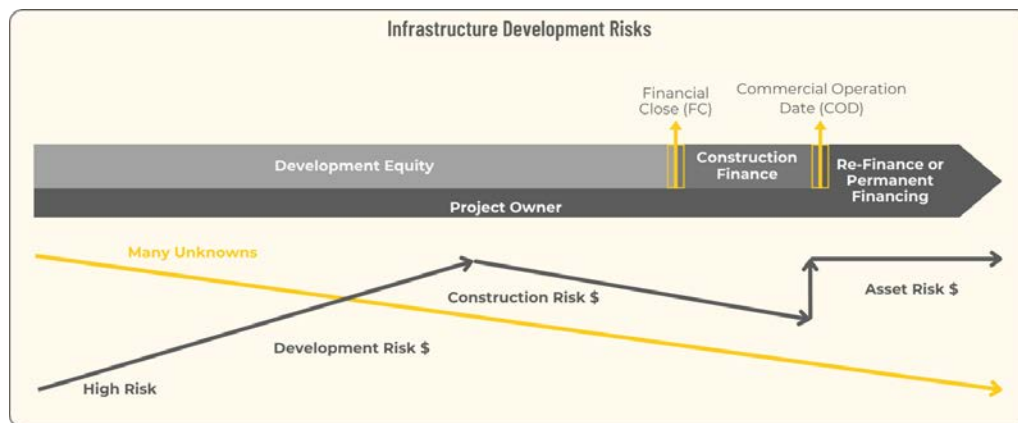
## Construction Management:

1. Oversee engineering aspects during construction.
2. Continuously monitor project schedules and costs.
3. Ensure strict compliance with all permitting, interconnection, and regulatory requirements.



## Development Risk Mitigation

The cornerstone of the intricate project development process is meticulous risk management. Discerning potential risks and the subsequent formulation of a comprehensive mitigation plan are pivotal in ensuring the seamless progression of projects. The ensuing depiction outlines the fundamental components essential for project development, wherein each building block necessitates a thorough risk assessment. The illustrative example below involves an inquiry into the repercussions of escalating project costs on the overall project economics.



The graphical representation encapsulates a lucid and intuitive perspective. Notably, risks are most pronounced at the inception of development projects. As a strategic measure, implementing a comprehensive project plan systematically addresses uncertainties such as interconnection requirements, resulting in a consequential reduction of risks. ZGlobal leverages its extensive decades-long experience to adeptly navigate the nuanced challenges inherent in different phases of project development cycles. Our commitment lies in the adept management of risks, thereby ensuring the successful realization of our clients' objectives.

## ZGlobal Operational Services

### Wholesale Electricity Market Services

#### Day-Ahead Market:

- Market Power Mitigation Test: Ensures fair competition by revising bids failing the test to predetermined limits.
- Integrated Forward Market: Establishes generation needed to meet forecast demand.
- Residual Unit Commitment: Designates additional power plants for the next day's needs.
- Bids and schedules open seven days before electricity is needed and close the day before the trade date.
- Results are published at 1:00 p.m.

#### Real-Time Market:

- Spot market for utilities to buy power for last-minute demand increments not covered in day-ahead schedules.
- Secures energy reserves for ISO's use if needed and regulates transmission line stability.
- Operates from 1:00 p.m. prior to the trading day, closing 75 minutes before the trading hour starts.
- Results are published about 45 minutes before the trading hour.
- Dispatches power plants every 15 and 5 minutes, with a 1-minute interval option.

#### Ancillary Services:

- Regulation Up: Provides additional generation instantly.
- Regulation Down: Reduces generation or stores power instantly.
- Spinning Reserve: Standby capacity from connected generation units available in 10 minutes.
- Non-Spinning Reserve: Capacity synchronized to the grid and ramped in 10 minutes.

#### Congestion Revenue Rights (CRRs):

- Financial instruments offset congestion costs in the day-ahead market.
- Available through allocation, auction, and bilateral trades.
- Settled based on the marginal cost of congestion.
- Revenue rights obligation pays when congestion aligns, charges if opposite.

#### Resource Adequacy:

- Ensures the electricity system always meets demand.
- CAISO and SPP use resource adequacy standards to meet load obligations.
- Standards may vary across ISOs, augmenting reliability metrics from capacity markets.

#### Energy Imbalance Market (EIM):

- Real-time voluntary market operated by CAISO for a ten-state region.
- Balances generation and load in real-time across the western region.

#### Traditional or Vertically Integrated Markets:

- Consumers purchase power from the utility serving their area.
- Utilities typically have long-term agreements with suppliers or own generation plants.
- ZGlobal facilitates services between these markets, adhering to distinct rules and regulations.

**Demand-Side Resources:**

- FERC orders, such as Order 719 and Order 745, create opportunities for demand-side flexibility.
- Enables demand response resources, energy storage, and distributed energy resources to participate in organized wholesale markets.
- Orders like 841 and 2222 remove barriers for innovative energy resources to earn revenue through wholesale markets.

## Portfolio Modeling, Management & Optimization\

In the realm of ZGlobal's operational services, our focus on portfolio modeling, management, and optimization is paramount. Clients seek confidence in decisions impacting their portfolios, aiming for enduring value. ZGlobal's approach involves maximizing cash flows while adhering to physical, environmental, and regulatory constraints.

We integrate due diligence, economic value assessments, value engineering, tax-efficient planning, and performance improvement to help clients make informed decisions.

ZGlobal's track record includes assisting clients in justifying significant investments in existing assets, providing the insight needed to turn opportunities into actions, and instilling confidence in maximizing the potential of energy investment portfolios.

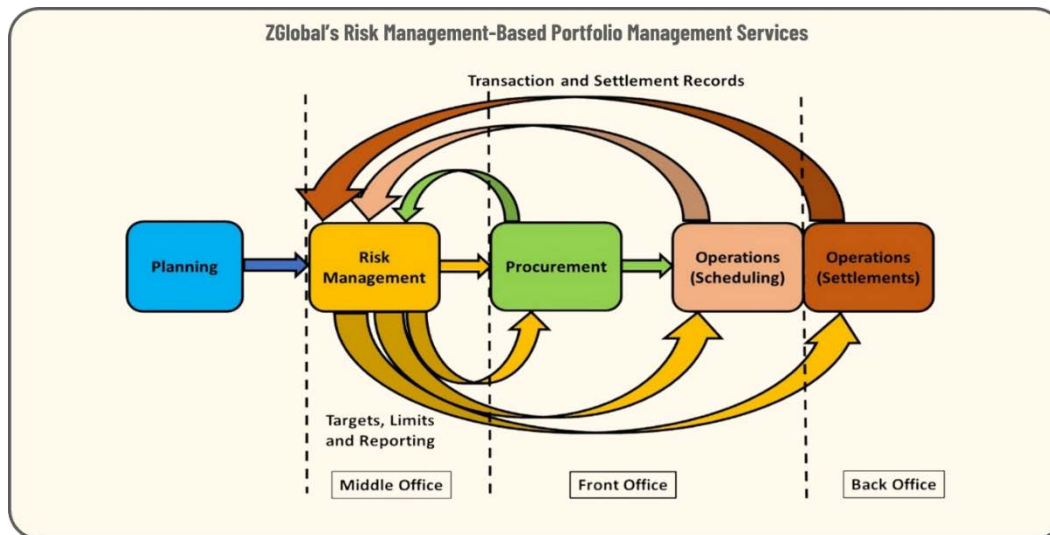
## Portfolio Management & Risk Management

The portfolio's dynamic nature, susceptible to alterations induced by weather conditions, outages, or shifts in the electric grid configuration, necessitates continual updates and robust risk analysis. Our strategic approach encompasses portfolio management and risk mitigation facets, ensuring resilience and adaptability.

Key components of this multifaceted strategy include:

- 8. Portfolio Balancing Projection:** By employing advanced analytics, we optimize net revenue for resources in a client's portfolio, such as variable energy resources (VER) and energy storage resources, by meticulously assessing scheduling and bidding strategies for energy contracts to proficiently manage net open position risks. This entails comprehensively evaluating open positions in energy, capacity, reserve obligations and transmission.
- 9. Imbalance Energy Cost Forecast:** Anticipating and forecasting the imbalance energy cost, which represents the volume of electricity to be bought or sold in response to market fluctuations in supply and demand.
- 10. Risk & Supply Management:** An intrinsic element of our portfolio management involves the seamless integration of risk management, illustrated in the figure below. This integration aligns middle-office functions with front and back-office activities, forming a cohesive and closed-loop approach to procurement and risk management.





Our risk management function, akin to the middle office, establishes limits, ensures procurement activities align with those limits, and provides regular reporting on compliance with targets. Front office responsibilities include transaction engagement, guaranteeing contractual product deliveries, and supplying transactional records for middle office tracking. The back office, responsible for settling with counterparties and reconciling transactions with invoices, ensures accuracy and resolution in the case of any discrepancies. The feedback loops within these functions and offices establish a harmonized and integrated procurement and risk management approach.

- Conduct energy portfolio risk analysis encompassing daily value-at-risk, cash-flow-at-risk, and earnings-at-risk.
- Offer risk assessment input to the hedging program and transacting activities.
- Systematically housing load and supply data in the deal capture system for integrated operation and system-of-record functionality.

This comprehensive strategy, fortified by ZGlobal's expertise, ensures the efficient management of portfolios and the mitigation of risks in a volatile energy landscape.

## 24/7 Operations

### Short-Term Demand Forecasting

ZGlobal employs a meticulous approach to short-term demand forecasting, starting from the ground up. Our methodology involves analyzing retail customer types and counts, utilizing historical patterns, weather forecasts, and weighting factors. This process generates an hourly forecast for the upcoming day and extends up to ten days forward. We gauge load forecast accuracy by comparing it to metered demand scheduled in the day-ahead market, establishing a baseline for measurement.

- **Demand Annual & Monthly Forecast:**

Our forecasting adapts to diverse customer portfolios and requirements, providing load or demand forecasts for day-ahead scheduling and resource planning occurring months or years ahead. Machine learning, a form of artificial intelligence, enhances our internal forecasts by incorporating insights from third-party vendors. We employ a variety of machine learning algorithms, including Neural Networks, Random Forests, and XGBoost, leveraging historical meter demand usage data and recent weather data. Continuous updates refine accuracy, minimizing electricity costs.

Annually, we manage over 14 TWh of energy demand within our client portfolio, which spans diverse climates in California. ZGlobal maintains a Mean Average Percent Error (MAPE) of approximately 0.45% when comparing forecast errors to a perfect forecast. This precision in forecasting contributes to effective demand management.

- **Intermittent Supply Forecast:**

To integrate sporadic resources like wind and solar into the grid, ZGlobal conducts forecasts using various tools and sources. Our expertise ensures reliable predictions for managing the challenges associated with intermittent energy sources, contributing to grid stability and efficient energy transmission.

## Transmission Capacity Allocation & Auction

Transmission congestion arises when specific power lines operate at total capacity, potentially impeding the ability of other lines to carry additional loads to meet demand. This limitation, contingent on the load or demand pattern, can restrict the insertion of generation at specific geographical points due to congestion on the transmission network, and resolution may not be straightforward, cost-effective, or prompt.

Securing transmission capacity to mitigate congestion costs entails a two-step process for loads participating in the CAISO allocation and auction. In the generation case, participating in the transmission auction with CRRs represents the primary mechanism for hedging against congestion.

Transmission lines facilitate the long-distance movement of electricity across a high-voltage network. They are indispensable for delivering electricity to loads with the lowest transmission cost. This is a critical function for generation and loads within and outside the CAISO's jurisdiction.

ZGlobal plays a pivotal role in aiding clients who engage in the allocation and auction process to secure financial protection against unforeseen congestion costs due to transmission system bottlenecks. This congestion management endeavors to determine the expenses of transporting electricity from its source to the end consumers, known as the sink. ZGlobal excels in identifying the optimal financial hedge for transmitting electricity over lines with designated capacity limits, accounting for both volume and specific conditions within an hour, day, and season.

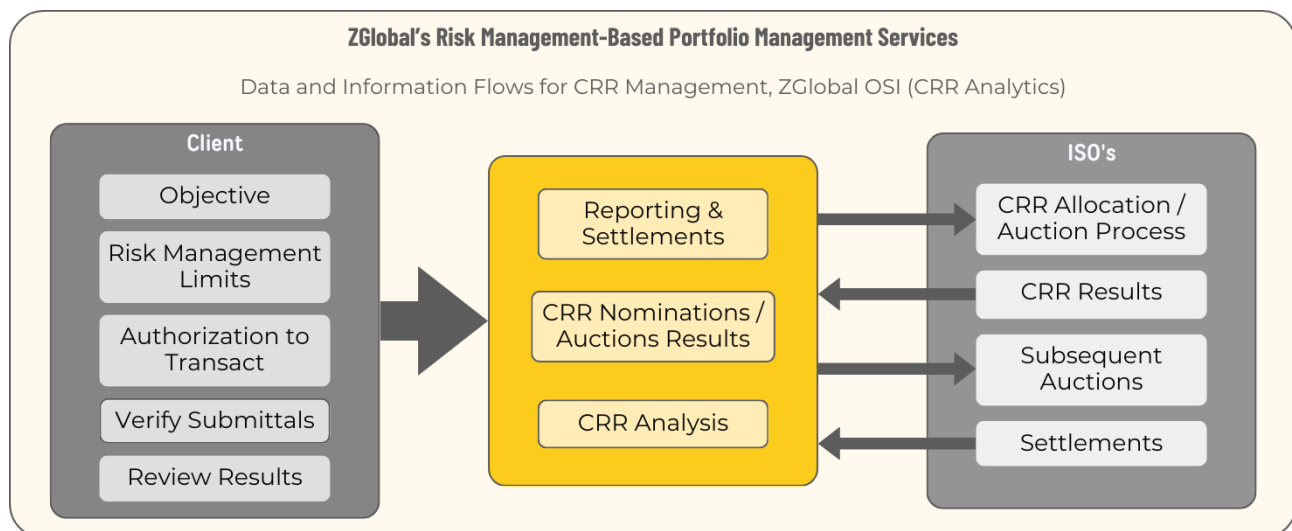


ZGlobal offers its expertise in participating in CRR allocation and auctions. Furthermore, we offer long-term and real-time transmission reservation services, facilitating the movement of energy from its point of generation to its destination while also scheduling the quantity and timing of energy transmitted over specific transmission lines outside CAISO and ERCOT. Additionally, ZGlobal identifies the generators requiring specific transmission paths and specifies the locations of consumers benefiting from this generation. Any reduction in supply, demand, or transmission capacity due to weather, fires, malfunctions, or other disruptions is promptly reported, with real-time adjustments to the schedule.

ZGlobal's objective is to minimize congestion costs while maximizing the delivery of cost-effective supplies to meet demand. The congestion management process involves the following steps:

1. Analyzing the inherent risk between supply and demand nodes.
2. Examining historical data to discern congestion patterns.
3. Estimating the necessary hedge amount based on the clients' generation portfolio.
4. Compiling a list of source-to-sink node pairs that mitigate risk between supply and demand nodes.
5. These sources are selected based on statistical and empirical analyses of historical data, encompassing price, revenue, and grid congestion patterns.
6. The chosen sources are highly correlated with the supply nodes and have a proven track record of generating congestion revenue based on historical data.

Despite the CRRs being obtained to cover the generation portfolio, it's important to note that, as financial instruments, they may only offer a partial hedge for part of the portfolio.



ZGlobal's optimization process involves developing short- and long-term portfolios that intricately match forecasted supply and demand. Hourly lists within the portfolios outline the quantity and location of electricity supply and demand, designate transmission paths, and detail financial implications for consumers or revenues for suppliers. The submission to the CAISO includes comprehensive insights into the transmission cost and strategically integrates energy storage solutions. This proactive approach submitted a day ahead of the operating day, ensures efficient grid operations, transparency in financial outcomes, and alignment with the client's long-term business objectives, embodying ZGlobal's commitment to excellence in energy management.

## Day-Ahead Energy Scheduling & Bidding

Derived from the optimized supply and demand/energy storage schedule, ZGlobal initiates the portfolio implementation on the day before the operating day.

This involves several crucial steps:

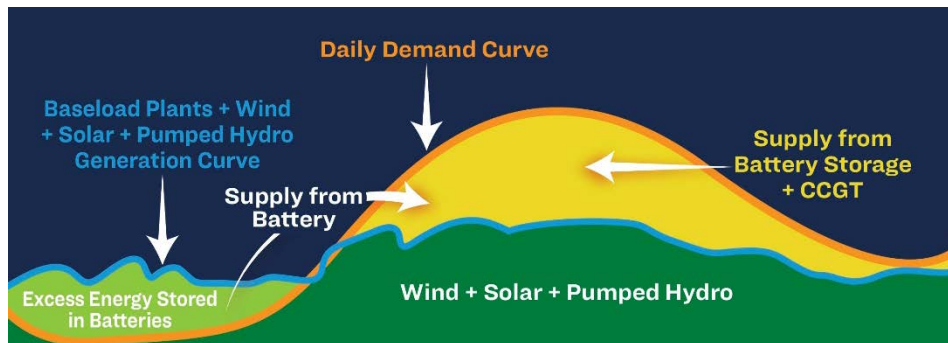
- 1. Demand & Supply:** Beginning with an output forecast, ZGlobal bids or schedules supply and demand into the ISO's day-ahead market in accordance with client-defined objectives.
- 2. Imports, Exports, Wheeling, & Inter-Scheduling Coordinator Trades (ISTs):** Verification of ISTs with counterparties occurs, ensuring matches in the ISO's systems. Mismatches are meticulously identified and corrected before submission deadlines, minimizing discrepancies through end-of-month checkouts.
- 3. Resource Adequacy Management:** ZGlobal schedules and bids resource adequacy resources, submitting outages that are compliant with ISO and CPUC rules. We have developed a Resource Adequacy Availability Incentive Mechanism (RAAIM) tool to assess potential charges when resources are unavailable.
- 4. e-Tagging:** Submission of e-Tags based on preschedules, received either from generators or the ISO VER forecast, with real-time updates in case of schedule changes.
- 5. Outage Coordination:** Planned outages communicated by generator owners are entered into the ISO's Outage Management System, with forced outages handled by ZGlobal's 24-hour real-time team.
- 6. Dynamic Scheduling:** Schedules and tags for pseudo-tie or dynamically scheduled resources are submitted in the day-ahead market and updated in real time as necessary.
- 7. Trade Execution:** Load, generation resources, imports/exports, and ISTs are scheduled or bid on in day-ahead and intra-day markets. Approved bidding and self-scheduling strategies are applied daily and in real-time to meet hourly demand forecasts, with submissions to the ISO and/or other Balancing Authorities adhering to relevant timelines.
- 8. Hourly & 15-minute Load Forecasting:** ZGlobal conducts comprehensive load forecasting on a daily, weekly, and monthly basis, providing regular reports that compare forecasts with actual load, and incorporating the financial impacts of forecast errors.

## Real-Time Operation

- 1. Re-Balancing Supply & Demand:** Continuously monitor expected energy supply and forecast load to determine hourly net open position and hedge percentage. Clients are alerted if the net open position exceeds tolerance bands.
- 2. Spot Energy Purchase & Sale:** ZGlobal, upon client request, contacts energy traders to procure energy on behalf of clients.
- 3. Energy Imbalance Market (EIM):** ZGlobal verifies schedules specified by e-Tags to match volumes submitted in the EIM Scheduling Portal (BSAP), incorporating changes for consistency.



4. **Bilateral OATT Transactions:** Scheduling and tagging transactions between balancing areas follows the WECC preschedule calendar, which is updated in real-time as necessary.
5. **24/7 Energy Production Monitoring:** Utilizing CAISO's Automated Dispatch System, ZGlobal monitors a resource's ability to follow Dispatch Operating Targets (DOTs) and contacts resource managers in case of curtailments.
6. **Battery Dispatching:** Management of hybrid solar and solar resources involves submitting a day-ahead schedule and monitoring weather forecasts to ensure battery dispatching in cases where solar alone cannot meet DOTs. Demand is met by a diverse power mix, including battery storage, which can smooth power mix fluctuations to meet demand.



## Financial Settlements & Environmental Services

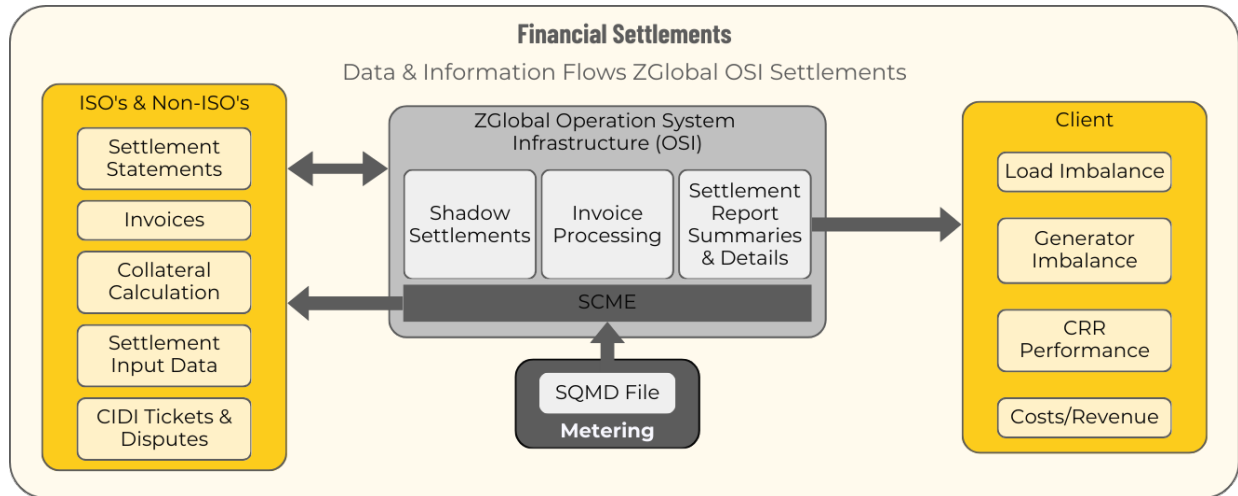
Financial settlements involve the meticulous calculation, billing, and invoicing of charges and payments related to market and transmission activities between ZGlobal and CAISO. This comprehensive process, comprising over 200 charge types in an organized market, follows a specific timeline that includes publishing statements, invoices, payment advice, and disputes.

1. **Settlement Verification & Education:** ZGlobal designs and maintains reports, acting as the primary contact for providing operational and settlement data to support clients in reviewing contract performance compliance, invoice validation, and billing.
2. **True Up & Disputes:** Custom processes enable ZGlobal to validate and reconcile ISO charges, initiating effective dispute resolutions for any anomalies in settlement errors.
3. **Carbon & Green Credit Settlements:** Renewable energy generates RECs and carbon-free credits, which ZGlobal documents and transfers to clients as an additional revenue source or proof of compliance with governmental agencies.
4. **WREGIS Accounting:** ZGlobal registers generators for clients in WREGIS, facilitating monthly transfers of RECs to corresponding off-takers.
5. **Greenhouse Gas (GHG) Accounting:** ZGlobal ensures compliance with California Air Resource Board (CARB) reporting requirements for clients' imported power, collaborating with verification bodies to facilitate site visits and maintain accurate reporting.



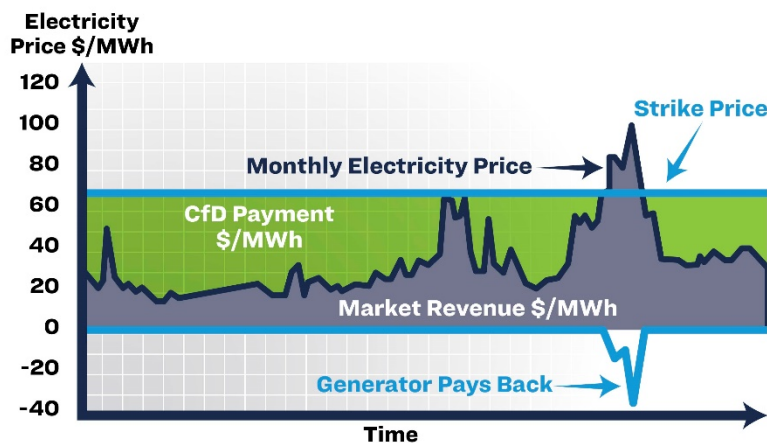
## Front, Middle, & Back-Office Integration

**Metering & Financial Settlement:** ZGlobal's financial settlement services encompass ISO/RTO settlement verification, shadow settlements, tariff verification, PPAs, and bilateral settlement verification and checkout with counterparties. Client-focused invoice and settlement reports are prepared to provide insights into the financial impact of energy transactions.



**Contract for Difference (CfD):** ZGlobal facilitates revenue stability through CfDs by managing long-term contracts between electricity generators and utilities or CCAs. This contract allows generators to maintain revenues at a predetermined level (strike price) for the contract's duration. The payment flow is based on market prices, and ZGlobal operationalizes bilateral contracts, performing CfD between demand, supply, and the ISO.

## Contract of Differences



## ZGlobal Operation System Infrastructure (OSI)

In executing its array of services, ZGlobal relies on its Operation System Infrastructure (OSI), which encompasses the following key components:

### ZGlobal Operational System Modules

- 1. Settlecore:** ZGlobal employs the Power Settlements specialized tool, "Settlecore" for same-day scheduling, bidding, dispatch, and settlements. This module encompasses eTag, Bidding, Scheduling, Deal Capture, and Settlement software. Through its Application Programming Interface (API), Power Settlements seamlessly interfaces with ERCOT and CAISO systems. This integration empowers operators to submit bids, retrieve market results, and access settlement statements efficiently and streamlined.
- 2. Forecast:** Leveraging third-party demand forecasts and an ISO's variable energy resource forecasts, ZGlobal meticulously conducts daily and hourly demand and supply forecasts. This process ensures accurate predictions, enabling proactive and strategic decision-making.
- 3. Metering:** ZGlobal interfaces seamlessly with clients' metering service providers, obtaining crucial 5-minute metering information on actual demand and supply. This real-time data serves as the foundation for informed forecasting and settlements, enhancing precision in decision-making processes.
- 4. CRR Analytics:** Internally developed by ZGlobal, the CRR analytics module calculates congestion costs, allocates point-to-point transmission paths, and facilitates participation in the CRR auction. This in-house solution ensures tailored analytics to optimize cost management.
- 5. eGrid Analytics:** ZGlobal integrates third-party optimization software, PLEXOS, into its eGrid module. This integration enables each node to model transmission, supply, and demand. The module executes a security constraint economic dispatch procedure, providing a robust framework for calculating electricity and ancillary service costs. This sophisticated analytics tool enhances ZGlobal's capabilities in managing and optimizing energy portfolios effectively.

### Client Interface (CI)

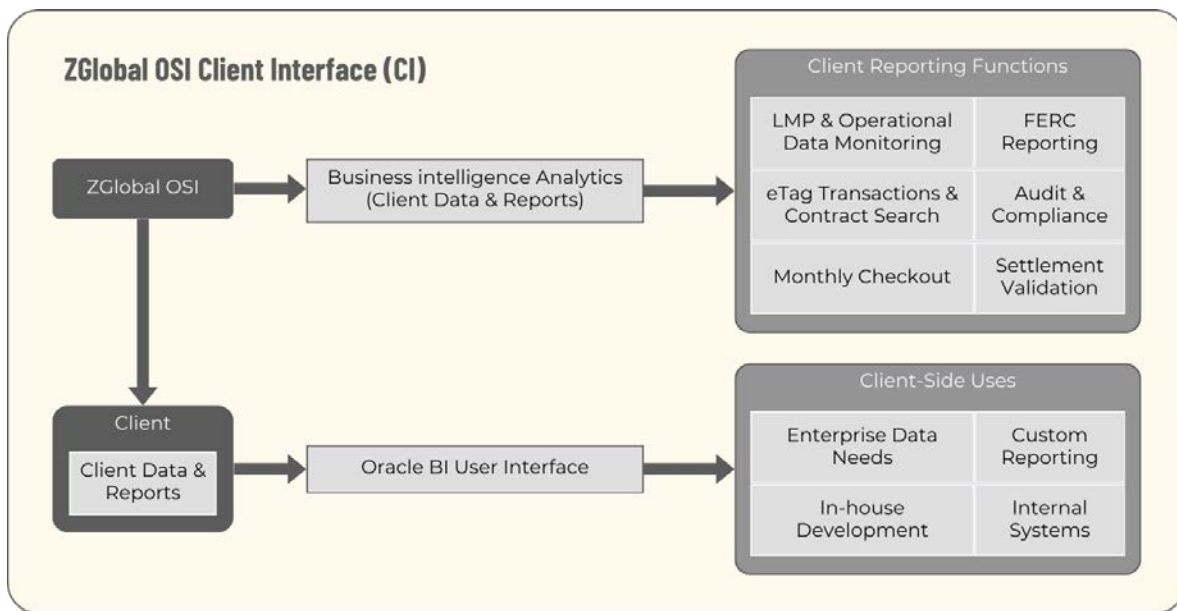
ZGlobal employs a robust Client Interface (CI) powered by Oracle databases and cutting-edge analytics. This system serves as a repository for all client-specific information, encompassing scheduling and settlements. Leveraging Business Intelligence Analytics (BIA), ZGlobal tailors this data for each client, providing a personalized and insightful experience.

Clients benefit from a user-friendly interface that grants them access to a comprehensive dashboard format, profit and loss (P&L) statements, customized reports, and the ability to download raw data for in-depth analysis. This secure and dynamic interface allows clients to stay informed in "near real-time" about the potential cost of electricity (for energy consumers), the potential revenue from the sale of their energy (for energy suppliers), or a combination of both. ZGlobal's CI enhances transparency and facilitates informed decision-making, empowering clients to navigate the complexities of the energy market with confidence.

## Client Access to Data

ZGlobal prioritizes transparency and accessibility for its clients, offering user-friendly and extractable web access to transactional data and settlement bill determinants. Through ZGlobal's Business Intelligence Analytics Server, clients can effortlessly navigate and extract relevant information using customizable report templates, including detailed resource-level allocation reports. This ensures that clients have a comprehensive understanding of their transactions and settlements.

In addition to providing data access, ZGlobal takes a proactive approach to support clients in maintaining operational compliance. We design and maintain reports tailored to keep clients informed about their adherence to operational guidelines. Our commitment extends to staying vigilant about changes in ISO market rules that might impact ZGlobal clients. We promptly implement necessary process changes to align with evolving regulations, ensuring our clients remain well-informed and compliant in the dynamic energy market landscape.



## ZGlobal Operation Control Centers (OCC)

ZGlobal's two Operation Control Centers (OCC) in Northern and Southern California serve as the nerve center for monitoring and managing energy production facilities and ensuring seamless transmission availability for delivering electricity to consumers. Staffed around the clock, 365 days a year, the OCCs play a pivotal role in maintaining operational excellence.

### Main Functions of the ZGlobal OCCs:

#### 1. Optimize:

- Operation and financial performance of 7,698 MW of generating facilities.
- Management of 3,981 MW of peak demand.
- Facilitation of 45 TWh in electricity transactions.

## 2. Operate:

- a) In collaboration with engineers and analysts, the OCCs generate daily portfolio management plans, communicate these plans to clients, and execute them meticulously.
- b) Hourly Duties:
  - i. Managing and recording generation and transmission outages, implementing necessary rerouting of electricity, and making real-time adjustments.
  - ii. Validating forecasted energy schedules against contractual commitments.
  - iii. Creating and submitting client schedules and/or price-sensitive bids and offers to the ISO.
  - iv. Monitoring generator unit parameters, ensuring availability, and optimizing generator performance.
  - v. Initiating day-ahead and real-time inter-SC trades in the ISO markets.
  - vi. Creating, modifying, and submitting e-tags to the relevant transmission operator.
  - vii. Recording transactions in the Deal Capture module.
  - viii. Calculating expected settlement amounts, including shadow settlements.

## 3. Interface:

The OCCs engage with clients, ISOs, and utilities on a minute-by-minute basis. The OCCs' diverse functions, facilitated by advanced technologies, ensure seamless communication and coordination, underscoring ZGlobal's commitment to operational efficiency and client satisfaction.

