

Advanced Analytics

At The Lantau Group we work with clients to understand their business questions.

We then apply the right analysis, creating new tools if necessary, to provide clean and defensible answers.

Energy is a complex, dynamic business. A handshake, spreadsheet or financial model can only take you so far. Our Advanced Analytics allow us to see the important drivers and hidden interactions that impact on risk, value and ultimately business success.

Understand and model constraints affecting optimisation of hydro facilities
Enhance participation in energy and ancillary services markets
Unlock hidden value by challenging third-party assumptions based on robust data and rigorous analysis

Understand the dynamics of solar-gas interfuel competition under different settings
Provide insight and projections of gas demand curves
Evaluate the economics and risks of investment in gas infrastructure to protect commerciality

Hydro
Optimisation

Coal vs Gas
vs Solar

Create bespoke models to address tough questions
Recommend optimised sizing and performance characteristics of large pumped storage project
Identify and optimise key value drivers

Energy
Storage

Competition
Economics

Forecast pre and post acquisition markets using bespoke models

Highlight the impact of ownership aggregation on market prices

Help gain regulatory approval from relevant competition authority

Ancillary
Services

The Energy
Trilemma

Accurate projections of investment economics under multiple constraints
Up-to-do understanding of regulations governing ancillary service markets
Maintain a suite of flexible tools to support a range of specific issues such as energy storage, reliability impacts, and service interactions

Understand how renewable energy changes the long-term cost characteristics of energy supply (high capital intensity, low fuel cost)
Combine decision theory, option valuation techniques, and revealed preference analysis to understand value trade-off
Challenge project robustness where superficial risk profiling may hide profit vulnerabilities

We work with a wide range of clients, helping them with analytical challenges across the region:

- Governments and regulators
- Private investors and financial institutions
- Generators
- Commercial suppliers to the power
- Regulated utilities
- Other energy stakeholders





QUAFU
夸父

1 Our in-house electricity sector model

- Models existing generation capacity and determines optimised least-cost future build
- Assesses behaviours of competitors and the effects of new policies, technologies and market dynamics
- Forecasts market outcomes: how to use (short-term dispatch) vs how to invest (system expansion)

2 Balances sophistication of model with simplicity of function

Calibrates Theory with Reality

Many optimisation models maximise theoretical potential, giving prices and market power that are unachievably high

QUAFU calibrates its optimisation process with historical data, taking account of known constraints and building on TLG's extensive experience to give more realistic and achievable solutions

Internally Consistent

Feasible problems yield robust forecasts

QUAFU's logic is tractable and assumptions are transparent: links between changes in inputs and outputs are robust

Easy to use: model interactions are accessible to non-specialists allowing 'on-the-fly' adjustments

Flexible with Broad Applicability

Brings together insights from energy projects on five continents with varied fuel mixes

Logic is robust across wide range of operating conditions and regulatory regimes involving centralised dispatch

Applicability for projects of any size, with any number of contractual, policy or real world constraints

3 Implemented for multiple markets across the region, and available under license

Input Assumptions

Plant and power network characters

Fuel network and supply details

Demand and peak load

Plant and network entry and expansion

Environmental policies

Optimisation Framework

Regulated and cost-based arrangements

Least cost dispatch and planning

Based on each generator's short run marginal cost (fuel price plus VOM)

Available units stacked against load to determine dispatch

Bidding-based arrangements with market power

Profit maximising dispatch and planning

Simulates outcomes by identifying bidding strategy that maximises sustainable profitability

Typical Outputs

Prices / margins / spreads

Emissions prices and/or emissions footprint

Fuel costs and fuel mix

New entry by type and timing

Unserved energy

Merit order / bid stack

Fuel deliverability profiles

Uses

Scenarios and sensitivities

Asset and contract values

Financial metrics

Measurement of risk

Transaction support

Business strategy development

Regulatory and policy analysis

For further information please contact us on projects@lantaugroup.com

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