



Accurate Modeling Value to IPP

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What Does Accurate Modeling Mean to a Developer?

In Development

- Project Feasibility
- Debt sizing for Project Finance
- Off-taker Contract Competition

In Operations

- Accurate Cashflow expectations
- Utility Operator Scheduling/Forecasting
- Performance Analytics Benchmarking

The Evolution of the Model Through the Life Cycle

Development Model

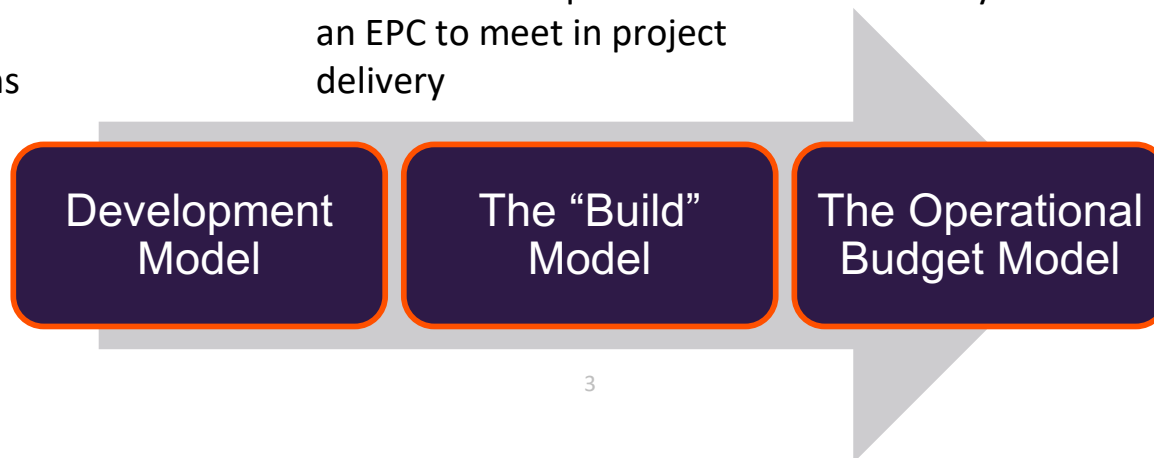
- Internal efforts to maximize value and reduce uncertainty
- Optimization of Project to determine lowest LCOE aligned with an accurate model
- Data and Iterations

The Build Model

- Maintain internal model aligned with an Independent Engineer view.
- Refinement of model to the detail
- Establish requirements for an EPC to meet in project delivery

Operational Budget Model

- Generation forecast model to estimate cash-flows and schedule with utility/operator.
- Outlook required for 20-40 years.



Where Do We Actively Reduce Uncertainty?

Data, Data? DATA!

What Is Available and What Is Needed

- Resource data in the market is variable even when source is the same (satellite). Different providers and their own processing can result in differences to resource for energy forecasting.
- Ground correlation using field installed measurement campaigns are used to help tune ground-measured values with satellite modeled values, extrapolated to 10+ years of historical.
- Of all the various uncertainty components in energy forecasts, we see resource data as one we can take control of by collecting more data.

What does Tuned Data Mean to Models?

Resource Campaigns and their Importance

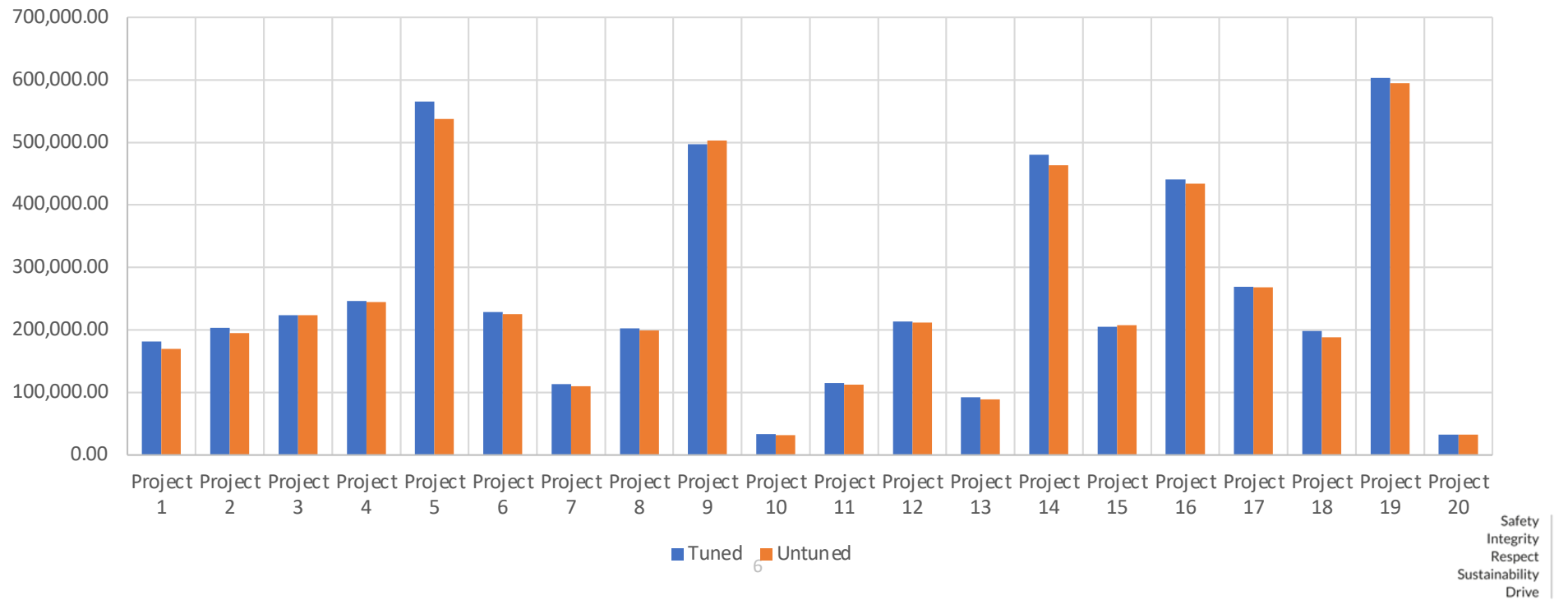
- Reduction of total combined uncertainty between 0.003% up to 0.08%.
- In MOST Cases, an increase in P50 and therefore P90 values, but not always (Year 1)
- Increased P-xx values result in higher debt sizing; P90-1yr values specifically reduce the downside risk to lenders
- A 40-year NPV of such value gains for a project can easily represent millions of dollars, even for marginal uncertainty reductions.



The Value of Resource Data

Reduction of Uncertainty

Tuned vs Untuned P90 Values



By The Numbers

The 20 Case Study Projects

- Independent of DC size, we observed an average of \$70,000 for every 1% increase in P90-1yr.
- Same Sample showed a 2.3% average gain in P90-1yr using Tuned Data
- In 2 cases where P50 and P90 decreased, we still observed a reduction in uncertainty; primarily a reduction due to resource correction from data sources.
- More Data Upfront for resource uncertainty reduction provides improvement, either in value gain or correction of financial assumptions.