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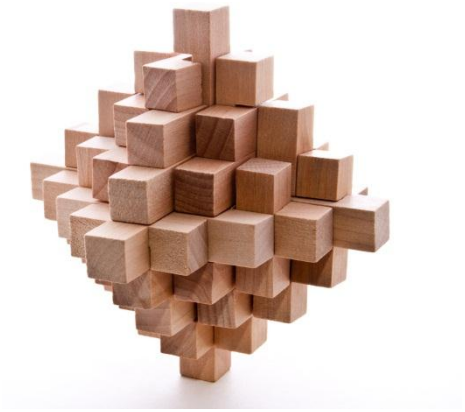
Energy Modelling and Planning

A tested sustainable input to simplifying energy investment decisions



All too often renewable energy technology providers are permanently married to their technology and lose sight of the client's core objective

The selection of energy Technology is as a result of the output of the energy model and not an upfront catalyst to the process. By altering your approach, i.e. in terms of understanding the all-inclusive approach, and then committing to a generation technology, your decision will meet the fundamentals that speak to a sustainable net effect.

Energy security, cost, access to grid and grid capacity are a few factors that contribute to a company's energy investment decision in the short, medium and long term. At the same time mitigation strategies relating to greenhouse gasses (GHG) should be built into any decision thereby taking advantage of future incentives through a planned implementation timeline and mitigating further risk that would be evident in future policy. Notably energy consumption can be divided into numerous secondary energy (usable energy) baskets resulting in a material contribution to total costs for any financial period.

Coupled with any energy model output is the art of capital efficiency, both for the developer and client from a Fee-For-Service or direct investment decision perspective. These are areas that are closely related and should not be independently executed.

Building and analysing scenarios is necessary before making any investment decisions. A typical scenario in this space speaks to the optimisation of cost and efficiency when reviewing investment decisions and the subsequent operational considerations. Consideration given to energy efficiency as a standalone focus is simply not enough when driving a policy of prudent investment decisions.

Why approach your energy investment, souring and procurement decisions on the principle of energy modelling and planning?

- Energy investment decisions are informed decisions based on an accurate energy model encompassing technical fact, energy economics, energy policy and experience within the energy sector. Ultimately mitigating the pitfalls created by an industry that continually sheds cost of technology yet one that is adversely affected by exogenous factors that can be managed but not controlled;
- Generation and supply decisions are developed on the basis of future scenarios. Offering insights into the happenings of tomorrow that are not solely reliant on raw data of yesterday to mitigate future risk;
- Development of an energy model speaks directly to the development of a business case as the nature of the model is all-inclusive. Energy efficiency as a standalone speaks to yesterday's dataset and is blindsided by exogenous factors;
- Scenario planning offers a platform to test options in an accurate manner without the capital risk, a benefit absent from a standalone energy efficiency environment;
- Integrated reporting is substantiated through all-inclusive fact and not operational efficiency assumptions; and
- Competitiveness in your sector is leveraged through investment decisions that drive the bottom line, thereby freeing up cash flow for other activities that are directly related to revenue generation.

Past experience shows that all sustainable business decisions are made on tested assumptions by considering a number of scenarios. Energy sustainability is a long term commitment made today that must follow prudent fundamentals throughout the planning phase.

Approach

The approach and tools used when developing an energy model is dependent on the specific project. Secondary energy baskets will be populated and then incorporated into a macro model in order to determine a realistic and inclusive result. As for organisations that have multiple sites, these sites will be modelled into one model, thereby optimising cost and efficiency across the board.

Technology is as a result of the output of the energy model and not an upfront catalyst to the process. Deloitte is not married to any form of technology and therefore remains objective to your specific aspirations

Step 1: Engineering transient simulation

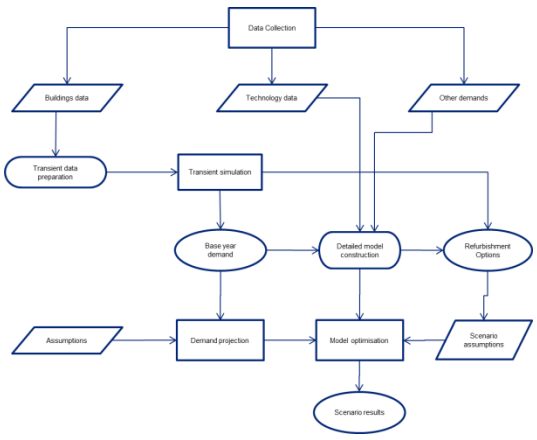
This tool is used to evaluate the energy demand of a specific demand centre and determine the effect of specific technological interventions on the energy demand. The model is complementary to an overall tool that is driven by exogenous demands.

Step 2: Utilising an overall modelling tool that focuses on optimisation.

The transient outputs will be used as input to the overall modelling process together with technological, economic, environmental and policy data. For example, the type of existing infrastructure, efficiency, type of fuel, capital cost, emission coefficients, direction of imminent policy). This step includes a detailed scenario planning process. Typically Deloitte considers one to three scenarios as required.

Typical scenario in this space speaks to the optimization of cost and efficiency when reviewing technology and the subsequent operational aspects of the decision

High Level Energy Modelling and Planning Approach



Data

The vast majority of the top energy efficiency companies will run accurate base line assessments. The integrity of the data will be vetted through the understanding of the methodology that has been applied and potentially random audits. Note that the success of any model is limited to the quality of the data inputted and the professional team, determining the usability of the output.

There are situations, although rare, where the data is simply not available. In such cases Deloitte will calibrate the model manually. In order to do so, there are specific data requirements such as:

- Usage patterns;
- Existing system specifications;
  - Technology, economic and environmental data (e.g. existing efficiencies) of existing stock and future technologies available after the base year;
  - Load shape for demand and for electricity end-use technologies;
  - Emission factors if we include pollutants other than CO2;
  - Construction of the building envelope;
  - Fuel prices (electricity and other fuels as required);
- Geometry of the building typology (detailed architectural plans).

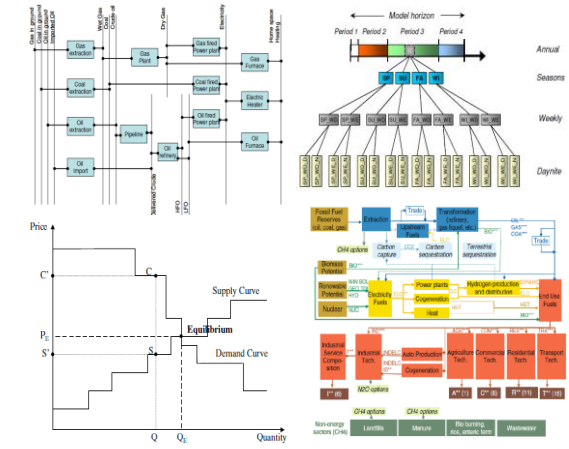
Delivered Results

Dependent on the core objective, these are a few outputs that may be considered:

- Energy demand by demand center A / B / C;
- Effect of particular measures on the energy demand by category / centre;
- Optimised implementation path of the measures over the time horizon of the analysis;
- Technology and fuel mix by period over the time horizon;
- Total emission by period over the time horizon (in the basic approach only CO2); and
- An integrated energy model.

Numerous other results can be presented based on your specific drivers.

Illustrative example



Make or Break

There is consensus, with particular reference to our clients that a number of risks are of a material nature in the energy space.

Deloitte offers robust innovative solutions to clients that have specific energy requirements. The energy modelling and planning plug-in has the depth to effectively mitigate the level of guesswork in making decisions. For example, the energy modelling and planning plug-in drives a sustainable value add and increases the certainty of project outcomes.

In our experience, from an energy perspective, optimal project value is secured through:

1. **Delivery of a project's robustness and risk review:** Evaluating the business case from an all-inclusive energy perspective, testing and validating assumptions while framing risks and modelling key drivers.

2. **Improving project approach and identifying ways to eliminate waste**: Analysing how value is created throughout the cost optimisation and efficiency drive, enabling the identification of value enhancement opportunities both in energy model design and execution.

3. **Identifying new sources of value:** Driving bespoke solutions. The output of the model will allow for innovative decisions to be taken that are calculated and motivated.

For companies to increase their level of confidence in energy supply / demand improvement projects, a drive to all-inclusive energy models must be undertaken by the leadership teams of the respective companies. Deloitte can mobilise key skills quickly and accurately at this critical time within your procurement process.

Coupling this service with Capital Efficiency solutions makes the vast majority of recommendations in an all-inclusive model attainable. The combination of our specialist Capital Efficiencies team and a dedicated Power Solutions team brings independent understanding and solutions to the table, mitigating your project risk (including future tax considerations) and optimising the fundamental objective of generating a positive return through substantiated energy investment decisions.

Benefits of the Deloitte approach

- Understand your requirement in a practical manner
- Build the energy model
- Drive the sourcing / procurement process in partnership with your company
- Drive the available incentive programmes and position for future risk mitigation strategies (for e.g. carbon tax)
- Infuse capital efficiency solutions
- Implementation
- Lead the optimisation of the energy model over the short, medium and long term
- Monitor and evaluate for results

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