

MIIS Challenge

About Trading Technology Australia

Trading Technology Australia (TTA) was founded in 1996 and has a background and client base in the financial markets. In 2002, TTA delivered its first Energy Markets project in the form of a risk management report to the CEO of a large electricity retailer. Since then, TTA has been working both independently and in collaboration with industry and academia to further understand the energy markets issues such as market liquidity and transparency and the relevance of particular models used in trading and risk.

TTA is focusing on three areas of service delivery to the energy markets: Research and Consulting, Integration Projects and Model Development.

Research and Consulting

There are problems across the electricity industry with data availability, reliability and transparency. When data is not available, the obvious solution is to use a model to 'fill in the gaps'. A prime example of this is with electricity forward price curves, where the lack of availability of 'tradeable' prices necessitates the use of a model to create the entire curve.

The resultant model output is then used as input to the next, higher level model. It is not uncommon to use a chain of these models (for example, price curve, price volatility, price escalation, option pricing, risk simulation) to arrive at a result. It must be remembered that the reliability of each model relies on (i) the soundness of assumptions contained in the model itself and (ii) the reliability of the input data. If a group of models are chained together in this way, the effect of unsound assumptions (especially in the lower-level concepts) will multiply up the chain until the error they cause in the final result is very significant. It is therefore obvious that models must be shown to behave in a real-world manner.

To this end, TTA has been conducting (and will continue to conduct) research into identifying models that are based on sound assumptions and defensible mathematical principles. Initially (and logically) we are starting with first principles, which are the data (from AFMA, NEMMCO and d-cypha) and the specific physical grid attributes underpinning the NEM.

Model Development

Over time, TTA plans to identify and implement a range of models that each targets a specific area of the industry and of the client's business (for example, a forward price curve methodology designed for traders may differ from one designed for risk managers). Each of these models will be capable of being configured to run as part of a larger overall system, or even as a stand-alone model. For integration of models with trading or risk systems, there are three possibilities:

- Existing 'in-house' systems can be enhanced with the integration of the TTA models. Provided there are not major deficiencies with the in-house system, this may be a very time-and-cost-effective upgrade path.

- TTA models will be available for use within tailored integration projects.
- A growing trend across larger application vendors is to sell a trading and/or risk system as infrastructure, with the ability for the client to ‘plug in’ their own (or third party) models. This gives the vendor flexibility to suit differing levels of sophistication among clients and the ability to focus on systems-related functionality. Over time we plan to write interfaces to popular commercial systems.

Integration Projects

TTA has a decade of experience with delivering efficient systems solution to the financial and energy industries, tailored to individual requirements, and in many cases including the client’s specified models. Over this time, we have shied away from the ‘monolithic system’ approach in recognition that each client has individual requirements. In tandem with our research and development efforts detailed above, our approach is to combine existing and future application infrastructure components with a tailored selection of models to produce client-specific configurations.

Problem

There are three most common measures of financial risk, which represent a risk-reporting backbone of any Energy Company:

- Value-at-Risk (VaR) is defined to be the largest net change (not necessarily the loss) of the position or portfolio’s future value within a given confidence level.
- Profit (or Earnings)-at-Risk (PaR or EaR) – measures probable loss in Earnings due to market or volumetric movements within a given confidence level.
- PCE (Potential Credit Exposure) - risk of losses caused by a counterparty or an issuer defaulting on their payment obligations within a given confidence level. In absence of corrections due to credit ratings, very similar to the above two.

To our best knowledge, there have been no rigorous mathematical investigations into how mutually independent these measures are. It seems plausible, that the mathematical transformation might exist, which would map VaR onto EaR or PCE. If this is the case, then there would be no need in costly and time consuming redundant calculations and reporting. It will generate significant savings for Energy Companies by making their reporting framework more streamlined, transparent and risk-compliant.