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From trading to portfolio management

The transformation of Energy Utilities' business model

By Marc Cibrario

The portfolio management imperative

During the 1990's, in the early stages of gas and electricity market liberalisation in both Europe and North America, many utility companies started to engage in energy trading activities, i.e., buying and selling wholesale gas and/or electricity products through bilateral transactions or participation in organised exchanges.
Although the objectives were not always explicit, what was then called "trading" served two different purposes which were not always differentiated:

- A business activity seeking to create value from arbitrage and / or market price anticipations[1]
- A support activity to optimise revenue from generation output and/or source energy for retail sales

In light of several market disruptions – the California crisis in 2000, credit crisis following the Enron debacle in 2002, sharp increase of oil prices – many utility companies were led to re-think their motivations for trading as a business activity.

Meanwhile, companies started to realise that their more traditional, asset-based activities (generation, retail) often carried an important commodity market exposure, sometimes much greater than the one carried by their speculative trading books.

This exposure is becoming increasingly diverse and complex due to several factors:

- Companies' expansion into different market areas with different regional energy prices
- Evolving correlations between regional prices as electricity and gas markets mature and integrate
- The emergence of new traded instruments, most notably CO2 permits, with a complex interplay with electricity, gas and coal prices
- In some countries, regulatory uncertainties as to the persistence of tariffs and the imposition of price caps for retail customers

In addition, Sarbanes-Oxley inspired regulations on governance and control, combined with the effect of new accounting standards such as IAS 32-39[2] have created the need to recognise, measure, hedge and control energy risks as they impact the financial performance of utility companies.

In this context, energy utilities have adapted their business model and changed the way they manage energy along the value chain. At the heart of this transformation lies the concept of portfolio management, which consists of:

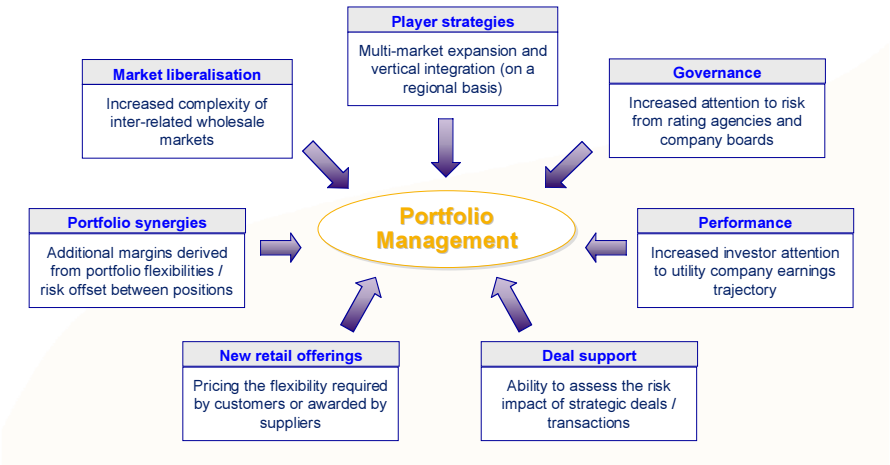
- Managing all physical and contractual assets – generation plants, sales contracts, aggregated retail commitments, etc. – as a portfolio of positions
- Managing the risks carried by this portfolio by entering physical or financial hedge transactions, in order to lock a given share of the future margins, based on a desired return / risk trade-off

The figure below shows the key business drivers for portfolio management.

Implementing portfolio management comes with profound strategic and operational implications. Specifically, companies find they have to work along several of the following improvement directions, which we explore below:

- Re-think their business model around portfolio management principles
- Enhance traditional asset optimisation with risk management
- Define and implement proper risk controls
- Bring a risk perspective to financial performance management

Figure 1: Portfolio management business drivers



Rethinking the utility business model

Typically, utility companies have organised themselves in business units along the value chain, for example in electricity: generation, wholesale / trading and retail units. The advent of wholesale markets has raised a key strategic issue:

(1) Also called "speculative"," proprietary" or "directional" trading

(2) IAS 32 and IAS 39, effective since 2005, introduce disclosure requirements and different accounting treatments for energy commodity positions according to their intent as own use, cash flow hedge or trading transactions.

- Can power generation or retail alone be viable businesses?
- If not, what is the right level of vertical integration for an integrated utility?

The answer varies, according to various factors such as the supply / demand, depth and liquidity characteristics of regional energy markets. Recent experience in many markets seems to indicate that pure plays in competitive generation or retail may not be viable because of the risks involved when faced with commodity price cycles over multi-year periods. In other words, vertical integration brings a competitive advantage, leading companies to seek some level of integration within each regional market they operate in.

However, this rationale may need to be revisited as markets integrate and price correlations increase, providing utilities the opportunity to be "short" in a given area and "long" in another one, hence to operate a balanced portfolio of businesses less sensitive to market risk than its components.

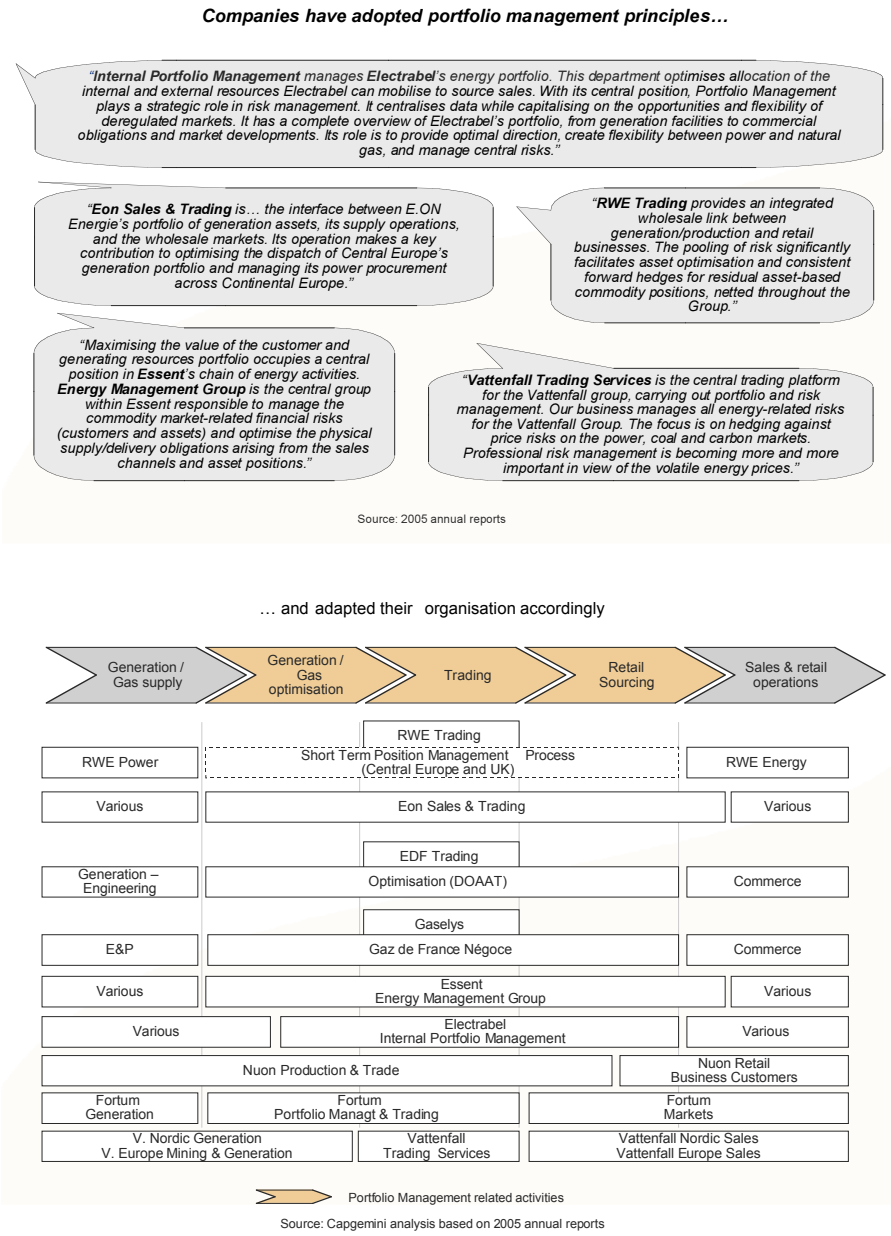
Vertical integration in turn brings up a series of organisational questions in terms of commercial and risk management responsibilities for the different business units. For example:

- Should a power generation unit be responsible for maximizing revenue from its output? Should it be allowed to transact with large customers or counterparties?
- Should a trading unit be responsible for the dispatch of power generation assets or long-term gas contracts? Should it address large end-users? Providing what type of services?
- Should a retail unit be responsible for its energy sourcing? For the structuring / pricing of its commodity products? Should it be held responsible for the impact of weather on its financial performance?

Although each situation may be specific, in our experience many companies have chosen to adapt the responsibilities of their business units along the principles of portfolio management. Specifically, they tend to:

- Centralise the management of the asset portfolio positions and associated commodity risks within a dedicated asset optimisation unit, allowed to make physical and financial buy and sell decisions
- Set up internal transfer mechanisms to ensure that the production and commercial units sell or source energy based on performance objectives that reflect their responsibilities

Figure 2: Examples of portfolio management business models for energy utilities



In addition, a profit-driven trading group is often maintained, either as a stand-alone business unit or as part of the asset optimisation unit. The trading group supports the other company units as an internal market broker – i.e., provide market access, price curves and pricing support for the entire company – as well as an adviser for portfolio management decisions.

While the role of trading has been somehow clarified, maximising its contribution to the overall business proves to be a challenge for many companies. The solution involves fine-tuning the link between trading and asset optimisation, on the one hand, and trading and sales, on the other hand, at a regional or even European scale. Still, keeping trading as a profitable business in itself while supporting other company units driven by different objectives remains a difficult balancing act.

Asset optimisation vs. risk management

Utilities that choose to centralise portfolio management need to clarify how the asset positions and the associated risks are going to be managed.

Traditionally, utilities have developed methodologies and systems to match resources to committed sales at a minimum cost. The underlying approaches pertain to optimal resource allocation under constraints, sometimes using stochastic algorithms of great sophistication in order to model the flexibilities embedded in gas storage, supply contracts or hydro-electric plants, as well as the impact of weather on energy consumption.

Such approaches are not sufficient to optimise a portfolio in the context of open wholesale markets, because of two main reasons:

- The existence of wholesale markets provides additional opportunities to optimise the portfolio through buy / sell transactions
- Daily or sometimes hourly price variations create additional risks as they impact the value of the portfolio positions

Furthermore, asset optimisation tends to involve a dose of speculation, whether voluntary or not. Indeed, waiting to sell excess commodity or to buy required supplies creates earnings uncertainty, as opposed to making the decision to buy or sell when the excess or the deficit is known. In other words, no decision can mean speculating, a sometimes recent realisation for utility practitioners.

Therefore, in addition to asset optimisation, portfolio management requires risk management principles. Such principles need to state:

- What type of hedging transactions are authorised
- What is the time horizon to hedge portfolio positions
- Whether deliberate speculation is authorised in the timing of hedge transactions, and if so to which extent, as opposed to a more "mechanistic" hedging approach

Assuming risk management principles are defined, one still has to determine actual hedge transactions. In this respect, financial sector practices are only partially helpful, because the utility portfolio exposure comes from:

- Direct price exposure between electricity or gas sales and the cost to produce or source the associated volumes, which has a direct equivalent in the financial sector
- Indirect price exposure linked with volume uncertainties, primarily from weather temperature correlation with market prices, which has no direct equivalent in the financial sector

Therefore, portfolio management for utilities requires companies to mix traditional asset optimisation with financial risk management principles to be defined by the industry. How to do this is quite a challenge because the underlying mathematical problem is highly complex. A practical solution may be based on an iteration of both approaches:

- First, asset optimisation is performed to determine the optimal use of portfolio resources; this operation creates a certain risk profile for the portfolio
- Second, physical and/or financial hedges are calculated and executed based on risk management principles
- Next a new optimisation is performed and hedges are adjusted accordingly

The risk control framework

Unless they are subject to financial institution regulations, energy trading units of utilities are not regulated as their financial counterparts[3]. Still, virtually all of them have implemented risk control practices inspired by the financial sector[4] .

As mentioned above, asset optimisation activities can also involve speculation, whether intended or not, and carry a significant market risk exposure. Under pressure regarding internal controls and the accuracy of financial statements, leading utilities have also started to apply risk control practices to asset optimisation, not just trading.

In terms of risk governance, the key principle is the segregation of duties between risk taking and risk measurement. Front office staff make portfolio management decision while

(3) Per the Basel accords, financial institutions must keep adequate equity capital according to the market, credit and operational risks generated by their activity.

(4) For example, based on the Group of Thirty recommendations from the early 1990s.

Figure 3: Illustrative contents of an energy risk policy

the middle office independently guarantees the integrity of risk indicators. In this respect, risk control is different from risk management, which is a front office activity.

Specifically, the risk control framework involves:

- Identifying roles, responsibilities and lines of reporting lines for all parties involved in risk management and control, both at the corporate and business unit level
- Defining of a set of relevant risk indicators (sensitivities, Value at Risk or VaR, Earning at Risk or EaR, stress tests, etc.[5])
- Defining risk limits, qualitatively – in terms of authorised instruments and time horizon – and quantitatively – in terms of specific limits on risk indicators
- Defining procedures to regularly report on, and analyse the risk position, as well as address limit breach situations
- Formalising the principles above in a formally approved risk policy document

A specific issue with asset optimisation activities as compared to trading consists in setting up risk limits. In the case of trading, risk limits represent the amount of capital which is deliberately put at risk in hope for a given return. In the case of asset portfolio management, a good share of the exposure may be undergone and difficult to hedge, starting with weather risk.

Therefore, setting up risk limits for portfolio management activities requires:

- First to determine the level of risk inherent to the activity and that cannot be reduced
- Then to decide how much additional risk it is desirable to allocate in hope for enhanced returns

Bringing a risk perspective to financial performance management

In principle, portfolio management, as the management of energy positions under specific return / risk expectations, is intrinsically linked with financial performance. In practice, our experience indicates that this link remains conceptual or has not been fully implemented.

Specifically, the risk dimension of portfolio management has developed somehow in isolation, as a necessary add-on to more traditional operations. As a result, risk management has brought progress to asset optimisation, but contributed in a limited way to financial planning and budgeting, reforecasting, reporting or performance analysis.

Bringing a risk perspective to financial performance management first involves the development of a joint finance / risk framework, starting with the translation of business model principles into proper transfer price mechanisms (volumes, valuation, timing) and analytic P&L adjustments.

Setting up or revising transfer prices often raises economic, organisational and managerial issues within senior management, and is made even more complex in markets where both tariffs and competitive offers are available. Here, it is key to:

- Understand where risks are generated within the company
- Decide whether the unit that generates the risk should indeed bear them or transfer them (to another unit or to the external market)

For example, the asset optimisation unit may not carry the risks associated with the creation of long term positions, such as power plants or gas supply contracts. Asset optimisation may instead carry the resulting medium term exposure up to the market liquidity horizon – typically three years – and its performance may be measured accordingly. In this case, the financial consequences of a plant shutdown or contract default would be born by another entity.

(5) Sensitivities measure the impact on the portfolio value or earnings of a 1 currency unit price move in a given energy commodity – VaR measures the possible losses of value at a given confidence level over a given holding period – EaR measures the possible yearly P&L losses at a given confidence level – Stress tests measure losses of value or earnings under specific adverse scenarios.

Another example: weather risk may not be born by the commercial division, because it has very limited capabilities to manage this type of uncertainty. Conversely, the commercial division may be incentivised to generate accurate market share and client consumption forecasts. In practice, it could purchase / resell energy internally at market price, and/or be subject to P&L bonuses or penalties linked with the quality of its forecasts.

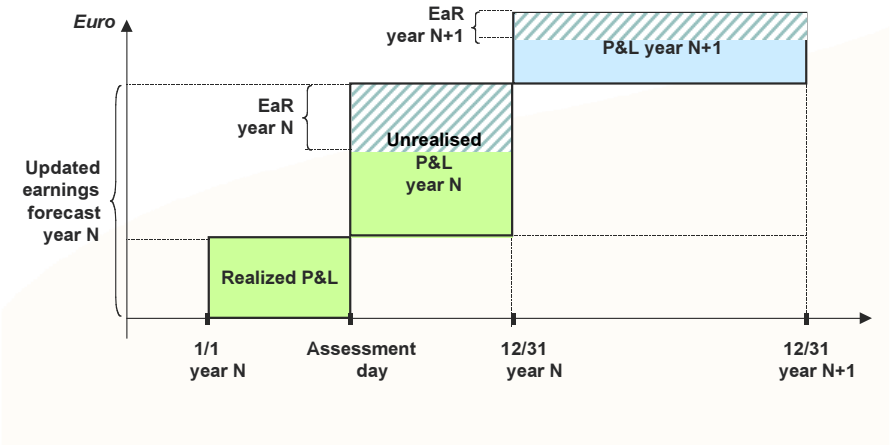
Risk limits are also part of the joint finance / risk framework. Risk limits are often set in a bottom-up fashion, by measuring the historic exposure and setting the limits accordingly. Although having risk limits in place is already progress, the next level consists in fine-tuning the limits by bringing more of a top-down view, asking questions such as:

- What are shareholders' / senior management's expectations in terms of "acceptable" uncertainty for the company's earnings? In terms of return / risk trade-offs?
- What are shareholders' / senior management's expectations regarding the company earnings sensitivity to power, gas, coal or oil prices?
- What is the uncertainty that is intrinsic to the business and cannot be reduced through better asset optimisation or risk management practices?
- Do return / risk expectations differ between the company units?

Once the joint finance / risk framework is defined, it needs to be made operational. This is achieved by:

- The definition of a book structure that serves financial and risk control needs
- The definition of financial and risk dashboards, with consistent indicators
- The embedding of a risk view in the financial management processes

Figure 4: Using Earnings-at-Risk to enhance utilities' financial planning



The first issue, the book structure, is rather straightforward in principle: Managers should bear P&L and risk responsibilities according to the means and capabilities they are allowed to use. However, implementation is often challenging because it requires a careful design of detailed business rules. Also, it sometimes gets political, when it leads to a reconsideration of financial responsibilities for several company managers at different levels.

The second issue, finance / risk dashboards, is important because it is the key tool to bring together financial and risk management. In the past, utilities have developed risk indicators such as VaR (Value at Risk) modelled after the financial sector. However, unlike what happens with financial trading, the VaR of a utility asset portfolio does not directly translate into performance uncertainty, better measured in terms of EaR. Moreover, financial VaRs do not account for volume risk, a key driver of utilities' financial performance.

Therefore, utilities need to design ad hoc risk indicators that are directly consistent with the way they manage their financial performance. This is illustrated by the figure 4, where Earnings may represent gross margins, EBITDA or net income, depending on the preferred financial indicators used by the company.

The third issue, the embedding of the risk perspective into financial management processes, is a logical consequence of the link between risks and financial performance. When fully implemented, it means the risk and finance functions work together :

- On an ad hoc basis, when considering strategic investments,
- When planning with a medium term horizon – typically three - five years
- When budgeting for the next year
- When reporting on performance, analysing past results and reforecasting every month

The process is as important as the sophistication of risk indicators. In fact it is better to use simple risk indicators with known limitations in conjunction with financial performance management rather than developing very complex metrics that remain disconnected from the financials followed by company executives.

Implementation challenges

It is clear from the improvement dimensions described above that implementing portfolio management is a difficult task. Although the roadmap may look straightforward, implementation is fraught with difficulties.

Specifically, in our experience, utilities encounter major hurdles such as:

- Dealing with the intrinsically technical and complex nature of portfolio management with positions bearing price and volume risk
- Meeting the resistance of managers whose area of responsibility is impacted by the new business model
- Mixing physical operations and financial trading type skills, and keeping the talent in house
- Adapting the IT infrastructure, knowing that no single, commercially available application can support end-to-end portfolio management processes today.

To make it happen requires a pragmatic approach. One way to be pragmatic is to trade off accuracy for simplicity. For example, price transfer mechanisms can be very complex, but companies may start with simple principles minimising analytic P&L transfers. Another example: companies that don't have stochastic models for asset optimisation or risk calculations can still determine hedge transactions based on simple sensitivities calculations.

Another way to be pragmatic is to start by focusing on specific issues that retain executive managers' attention. It may be the need to integrate new investments in the portfolio, the need to bring together trading and asset optimisation, the lack of risk policy at the corporate or business unit level, or difficulties to forecast or explain financial performance.

Overall, portfolio management has become a core competence for utilities in competitive markets. Its implications are such that implementation should be viewed as a programme rather than a project. Like any programme it comes with quick wins as well as ups and downs and the need for a healthy dose of change management.

Portfolio management leads utilities to adapt their business model, transform the way they optimise their assets along the value chain, introduce financial risk management at the heart of their operations and manage their financial performance according to their risk-sensitive shareholder expectations.

In this sense, portfolio management is not an option. It is a necessary step for energy utilities seeking to build a platform for growth as competitive energy markets continue to develop.

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For more information please contact:
Marc Cibrario
+33 1 49 00 22 08
marc.cibrario@capgemini.com

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