

# Data begets more data

**MARKETS** / Historic and real-time fundamentals are not the only information show in town, says software provider Kyos / **Peter Ramsay, Editor-in-chief**

A revolution in data availability in the European power markets offers a growing list of market participants both opportunities and challenges in management and interpretation. And it has also spawned a host of new service providers offering solutions to these actors.

To kick off this *Petroleum Economist* In Depth look, we spoke to Cyriel de Jong, founder of software and advisory services firm Kyos Energy Analytics, about how the market has evolved and about how data spawns more data.

**When we talk about ‘big data’, what do we mean in the European power market context?**

**de Jong:** The growth has been very much focused on data related to short-term trading and balancing markets. With more intermittent renewables generation, there is an abundance of supply data published by transmission system operators, or republished by specialist data firms. This is the major reason behind the big increase in data that companies can process and manage on a daily basis.

**But available data does not just cover supply fundamentals?**

**de Jong:** No, in fact most of the data that we as a company typically use, as we have more of a focus on the medium to longer-term, is data coming from exchanges. This is price data which, while some of it is intra-day, is mainly daily granularity. Yet, even if that sounds pretty simple—relatively small, stable data feeds—we see still see that mistakes are actually relatively common.

**What do you then do with the data in terms of customer offering?**

**de Jong:** Our tools and services are focused on forecasting, on making valuations of production assets and on calculating risk. We do that for renewable assets—wind and solar—and for conventional power plants. So, for example,

we might support a company in whether to make an investment decision in a new gas-fired power station or we might assess risk over a 20-year horizon for a windfarm project.

In our view, ‘big data’ is obviously, on the one hand, about managing historical or current data. But it is also about using it to generate more data about the future, e.g. scenarios. If you have, for example, 1,000 scenarios for spot power prices with hourly granularity going out for 20 years and you also have generation from different assets—plugging statistics into individual windfarms etc.—that very quickly adds up to a lot of additional data, with which you can do all sorts of meaningful analysis.

**What is your core customer base?**

**de Jong:** The main thing that we provide is a software platform. And its users range from traders through risk and portfolio managers to those more into longer-term planning. We do have some clients and some applications which look at optimised dispatch of power plants on a day-ahead or even an intra-day, half-hourly basis, but that would be a minority use case. Most our users are looking from next week to maybe a few months out; then from three months to three years out, the medium-term as I would define it; then three years out to 20 years in the long term. And these medium-term users would be well over half the client base.

**Who do you see as your main competitors?**

**de Jong:** Interestingly, really our main competition comes from internal resources at our client companies. Especially in the large utilities, they will weigh up the comparative benefits of doing this in-house or externally. This is especially true for what we offer in the medium-term space, where our software allows com-



Cyriel de Jong,  
founder of  
Kyos Energy

panies to manage their price risks related to, say power plants or for storage in the gas space.

With an increasing variety of players in the electricity markets, not just large utilities, in-house analysis and development teams are less common. This has allowed us to grow our business over the past years.

For longer-term project evaluations, there is competition from various consultancies, but they have more focus on consulting and market reports, much less on analytical software and risk management, again allowing us to differentiate ourselves here too.

**Do you ever get pushback from customers for the more ‘instructive’ services your product offers, i.e. they see it as telling them to do something where previously they had autonomy?**

**de Jong:** Sometimes that can be the case. We deliver software which gives recommendations about how to trade and how to hedge your exposure—not just to quantify the risks, but also how to hedge and reduce them. So, some traders might see that as a threat. And indeed, other people within the company, like the risk management department, might feel that they have internal solutions stuff to do the same or even better.

But it also cuts the other way too. People say, “I have to manage this position and it is actually more comfortable for me to have an approved risk policy with a tool which helps me to carry it out in a structured way. It gives me confidence that, if things end up not going very well, I can always say, ‘we followed our risk policy and processes, and this outcome resulted from a calculated risk.’” **PE**

# The rise of PPAs

**MARKETS** / The end of guaranteed prices for renewables generation is sparking a revolution in risk management / **Peter Ramsay, Editor-in-chief**

A power-purchase agreement (PPA) sounds inherently very simple. One party agrees to sell power in certain volumes over a certain period for a certain price, the other to buy.

But a renewable power asset is decidedly less simple, not producing a predictable volume of energy. Nor is the future price of electricity certain, or even observable beyond the liquid traded market. With PPAs the preferred method of underpinning the investment case in renewables assets, it is not surprising, Michael Waldner, CEO of software firm Pexapark tells *Petroleum Economist*, that understanding their price risk has become so important.

## Why are PPAs the fastest-growing segment of the power market?

**Waldner:** Obviously, there is the fact that renewables technologies have become competitive without subsidy and will meet most of the forecast growth in electricity demand. But there are also a couple of other factors.

One is that renewable energy investors are becoming new participants in the traded market, which is a fundamental change. In the past they were just financial investors into assets that operate in the energy space, but now they have become part of the market itself.

And the other is the ESG angle. You have more and more corporates and industrials flocking into the PPA market because PPAs are a very good means to fulfil at least part of your ESG requirements. Talking to an equity analyst recently, he identified PPAs as the easiest way to provide evidence to the market that you are working towards complying with your ESG goals. It is very visible—something you can measure.

## What are the challenges to pricing a PPA?

**Waldner:** The first is that they deal with very long tenors, ten or 15 years, to secure financing. And these long tenors, even for a standard baseload contract, are not observable in the market. On the exchange-

es, depending on the market, contracts often trade no more than two or three years ahead.

Another challenge is that each PPA deals with a specific production profile, due to location and technology. So how does that help you put a value on your PPA?

And a third is market volatility. Electricity is a commodity, so the price of a PPA must be built on this market—it is not just a fantasy price, but it has to relate to the prices for forward contracts which are trading today. And a PPA price which is valid today might not be valid anymore tomorrow, you need to have a constant view of the markets to see how much your energy is worth.

## How does Pexapark help solve these challenges?

**Waldner:** We have developed a reference PPA pricing with platform where we price, on a daily basis, various PPA structures across more than 17 European markets. Our tool gives you a fair price for standard structures with tenors up to 15 years.

We also regularly backtest these prices against PPA transactions we see in the market—we have supported more than 11GW of PPAs over the past three years. Obviously, there is a challenge around the fact that PPA prices are normally bespoke structures attached to a specific asset; you need to have the

capability to translate that into standard structures.

You also need to do calculations of your various risk elements and be able to compare risk/return profiles of different structures to get to your optimal

PPA. So a quantitative approach is key to solve that challenge.

And after closing a PPA, you need to continuously report on revenues and risks on your PPA and asset portfolio. To tackle all these challenges, we built a set of tools—an operating system—that gives you all the capabilities required to succeed in post-subsidy markets.

## Why are PPAs so transformational in the market?

**Waldner:** One notable change in the market is that, increasingly, in the post feed-in tariff world, more risk is being pushed to the investor side. And if you want to stay competitive as a renewable energy investor, you need to build up the capabilities to price all of these risks.

In short, it is an organisational transformation—you need front-office capabilities on how to price, but also you need to implement

risk reporting since you are now sitting on a floating position with your asset. And there are back-office elements: how do I invoice, accounting etc. So, it is a huge transformational undertaking for a company. The PPA is just the start of the journey. **PE**



Michael Waldner,  
Pexapark  
CEO

**“Renewable energy investors are becoming new participants in the traded market”**

# The imperfection of data

**MARKETS** / While transparency and data provision have made huge strides, there are still information gaps and quality problems, warns the founder of UK power analysis firm Catalyst Commodities / **Peter Ramsay, Editor-in-chief**

“We have, in addition to our presentations and expert written analysis, invested massively in our platform—that is our extra five people.” So says Paul Monk, who founded UK power price forecasting service Catalyst Commodities in 2014 after over a decade of power trading and analysis experience with French utility EDF and with Deutsche Bank.

Given Monk’s spend on data processing capabilities, one might expect him to be a full-throated evangelist for the information explosion in the UK and European power markets. But he has some caveats, around quality of data and around the UK market’s much-vaunted commitment to transparency.

**Is it fair to say that, in the power trading service provider universe, you have one of the more focused offerings?**

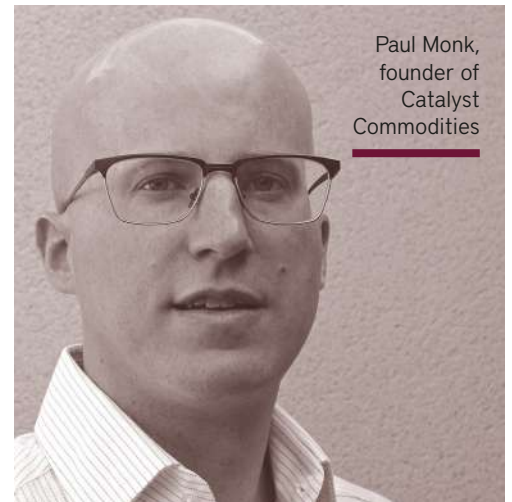
**Monk:** The niche that we have picked is the UK wholesale power price. That means trying to predict price formation, but also many of our clients are interested in the inputs and outputs.

Some of our clients just want the price forecast, either to benchmark against it or use it outright. And/or they want all the inputs, like the wind, plant availability forecast and so forth. So, we provide all of that, to the best available standard.

A lot of forecasting companies that we come across tend to give a high price forecast to assist with winning financing for customer’s assets. But most of our customers, being traders and trading analysts, just want the right answer. We have to speak our truth, and our deep commercial experience does not fit with the view that long-term prices will always make a new plant profitable.

**Do you think your background as a trader and analyst gives you an advantage in understanding how to add value to data for trader clients?**

**Monk:** A lot of the data is the same for everyone and is very transparent. So, ultimately, the way to compare it is like a chef in a kitchen. You can have the very best ingredients, but if you cook it badly, it is a bad meal, while, if you cook it well, it is great. Having that front office expe-



Paul Monk,  
founder of  
Catalyst  
Commodities

**“If you had a good feel for temperature, you could trade power quite successfully”**

rience is definitely beneficial in terms of knowing how our customers would like their food cooked. We try and put ourselves in their shoes as much as possible.

**Tell me more about your partnership with Tesla, the demand forecasting firm rather than the car firm?**

**Monk:** We linked up with Tesla right at the start because it makes sense for us to outsource that half of the model, and we like their approach. I have actually used their forecasts one way or another since 2003. But it is a two-way relationship. We can provide them with a lot of good information from our side, especially for the UK.

**With renewables, batteries and demand-side response, is it fair to say that power supply and demand have become more interlinked?**

**Monk:** I think blurred is one of the better ways to describe it. And it is just going to get more complex going forward, not least due to continuing transparency issues. To give a good example, in the UK we have somehow built 13GW of

solar and all of it is invisible. Nobody has a clue what it is doing—unless you own a bit of it, in which case then you have an edge.

[System operator] National Grids implies it provides actual output data for this capacity. But the data is not actuals, they are estimates. If you dig into it, the actuals for that 13GW are based on 300MW of rooftop solar in the Sheffield area. Are those estimates any good? Who knows? We get asked a lot, ‘can we have your solar forecast?’ We would love to make solar forecast, but how do we know if it is any good? Instead we work with Tesla on the net effect.

### And what solar is doing can make a significant difference in today’s power market?

**Monk:** The markets are so much more dependent on wind and solar variables. It used to be just about temperature. If you had a good feel for temperature, you could trade power quite successfully. But now all the other variables are equally important.

And one of the challenges with that is—because temperature was so important, indeed of sole importance, really—that it is only in recent years, when people have started to really care about solar, that the weather data providers have also really cared. So again, when you actually start digging into this data—and that is true of all data to some extent, but this in particular—the older stuff is dirty.

### Is that a problem isolated to solar?

**Monk:** The role of [UK energy regulator] Ofgem in this should be up for question. Ofgem comes to all the meetings, but it remains very quiet on the issue. It never says, ‘Why is there 13GW of solar and no-one can see it? Why are actual wind speeds at wind farms opaque?’ It seems they do not care. Our clients care, therefore we care.

Another example of where Ofgem has been asleep at the wheel is what we call ‘intraconnectors’, rather than interconnectors.

Take the Western Link, which, depending on your politics, could be defined as an interconnector, as it essentially connects Wales and Scotland with a 2.2GW line. Now, you might think, ‘2.2GW? That is the biggest interconnector we have got, probably in the whole of Europe. Surely everybody knows what is happening with it?’ No, zero information.

When that goes down, there is a massive impact on cash-out prices. Does anybody know what is happening with an asset equivalent to four nuclear reactors? Nobody has a clue. And Western Link was commissioned in 2017. Transparency is getting better, but there are still some glaringly obvious omissions. **PE**

# The rush to intra-day

**MARKETS** / The profits to be made from optimising a portfolio on a close-to-real-time basis have driven a significant shift in the market / **Peter Ramsay, Editor-in-chief**

It would have been difficult to imagine, just a few years ago, that a German spot power market participant would have not traded the day-ahead market. But that is exactly what customers are now telling Georg Ostermaier, managing director of German software firm Decision Trees.

The rise of the intra-day market has been a European power trading mega-trend in recent years. Ostermaier tells *Petroleum Economist* more.

### What is Decision Trees’ core offering in the in the European electricity space?

**Ostermaier:** Our core product is a comprehensive software system called DT Energy, which is a decision support system for any kind of energy asset portfolio. This could be a hydropower, thermal or renewables system or any combination of these. We also optimise heat pump systems; we optimise and offer decision support for industrial end-users. Our customers are not only utilities, but also those who produce some electricity, but are net consumers. They want to offer flexibility in their consumption to the market, to make money out of that, and our system also supports them.

### How has the market, and thus your offering, evolved over the past 15 years, given the huge changes in the European generation mix?

**Ostermaier:** Ten years ago, our customers were mainly large thermal power producers and some hydropower producers. Now the customer base is much wider: small utilities operating a few heat pumps, cement producers, automotive industry customers.

And what we have also experienced in the last two-to-three years is that customers are increasingly unwilling to host large software systems on their own servers and supported by their own IT department. Everybody wants to go to the cloud and have the software as a service, they do not want to care about IT stuff anymore. And the Microsoft Azure cloud is a very good environment to set such things up.

### And have you also moved increasingly intra-day?

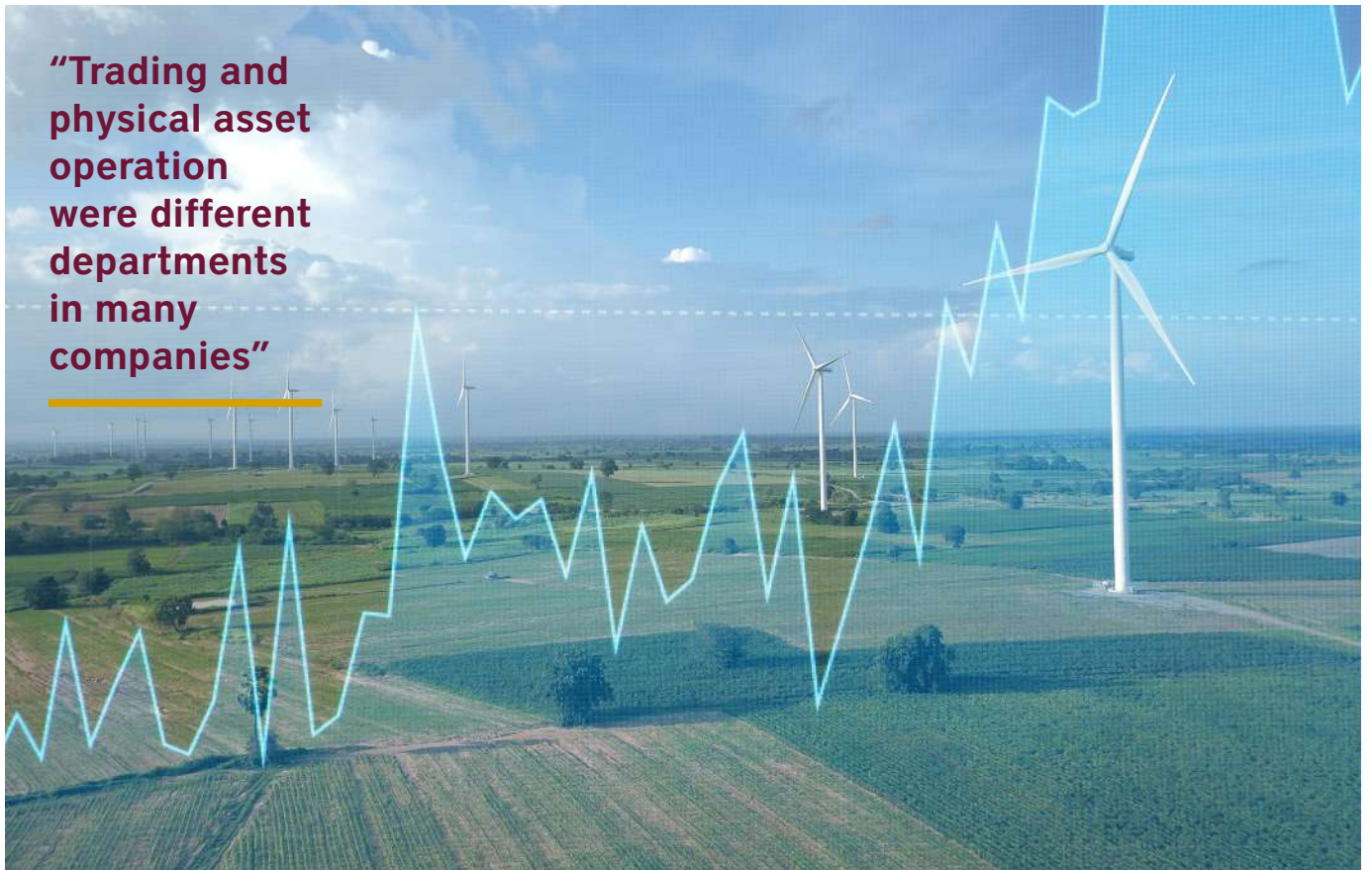
**Ostermaier:** The big profits are now made in the intra-day market, and that market is very volatile. In Germany in particular, there are more and more participants trading. It is a very liquid market. The big challenge is to have very quick short-



Georg Ostermaier, Decision Trees managing director

**“Everything is sold in the intra-day market because prices are better there”**

**“Trading and physical asset operation were different departments in many companies”**



term optimisation, to make most use of any flexibility you have in your portfolio on the intra-day market.

Just yesterday, we had a workshop with a customer, and they told us they no longer participate at all in the day-ahead market. Everything is sold in the intra-day market because prices are better there. If you have good software, that can automatically pick the best offers there—which might only be available for seconds or even milliseconds—then you can make a lot of money. This is the key to the success of algorithmic or automated trading systems in the electricity market.

And all this is driven by the massive increase of renewable production in Germany. Nobody can really predict how much sun and wind power there will be the next day. Demand is the other uncertainty and therefore there are a lot of quarters of an hour where the grid is either long or short—the intra-day market is where you can profit from that.

#### **How does a customer make the platform work for them?**

**Ostermaier:** We very precisely model the physical asset portfolio of the customer—be it an Alpine hydro system or a paper

factory or an automotive brakes factory. The customer wants to either make maximum profit in the market or to reduce power purchase costs as much as possible. And, at the same time, your paper or cement or brakes production must not be interrupted.

Different portfolios and different factories have greater or lesser flexibility, and it can be very complicated. It is not only about electricity, but also about all the other commodities and variables that are relevant in the supply chain. For example, outside temperature is often very important because, when it is cold outside, you need to produce more heat in your system.

All this needs to be modelled and recalibrated on a continuous basis. What is my flexibility and how much do I have? How much can I reduce my power consumption between now and the end of the day without affecting my production too much? In which hours do I reduce my consumption? And is my aim to make profit or just to reduce my purchase costs?

It can be a very complicated model. And in addition, there is constant uncertainty. Maybe right now the hour from five to six in the late afternoon is very cheap, so I decide to lower my production. But, in two hours' time, this hour

could then be more expensive and another hour will be cheaper.

#### **Is your core customer a trader or a dispatcher?**

**Ostermaier:** I would say it is actually a bit of both. Years ago, trading and physical asset operation were different departments in many companies. So, the guys who were trading on the market had no real idea of the availability of the assets and the asset operators had no idea of market prices. The market evolution over the past few years has dictated that these two things need to be brought together. In many companies it is now one business unit, optimising the physical asset portfolio against market prices.

In simple terms, it is obviously good to switch on a plant when prices are high, and it is better to shut it down and buy the power instead when prices are cheap. But there are restrictions—for example sometimes you cannot switch off because end-users need the heat generated from a CHP plant and you need to run that at any price. You need to know what all the physical elements that must be considered. Our software system can mathematically represent these things and do the calculations to maximise profits. **PE**

# Retaining the special sauce

**MARKETS** / Complex intra-day power markets increasingly require AI support. But it is important market actors have their own proprietary solutions / **Peter Ramsay, Editor-in-chief**

Traders are a breed apart. And while they jump at any tools that might give them an edge over their competitors, they are extremely protective of their own autonomy and ability to add value, and wary of tools that might impinge on this.

In European power markets, the line between IT trader support and algorithmic decision-making risks being increasingly blurred. *Petroleum Economist* discusses with Peter Bance, CEO of software firm Origami, how his firm aims to stay clearly on its side of the line.

**What, in layman's terms, do you offer to your core client?**

**Bance:** I would summarise what our energy data platform customers pay for in three simple words: see, decide, do. In terms of 'see', it is about the ability to ingest lots of different data streams, transform the data, then visualise that data in useful ways for customers' operations.

For 'decide' it is using advanced artificial intelligence and machine-learning algorithms to help with decision support. That includes stuff like forecasting, or position management, or portfolio optimisation. On 'do', our technology helps our customers with increasingly automated physical or financial actions on the back of those decisions. Physically, that could be asset dispatch, such as charging a battery. Financially, it could be making sure that a trade is placed on the right exchange.

**And the focus is very much on the short term?**

**Bance:** Our belief is that—as the renewables keep coming and volatility increases—there is more and more of a shift away from what was, historically, a market dominated by what was happening much further out on the curve, people locked into long-term hedges, not much activity in the near real-time space.

Our focus is on bringing that long-term world of structured hedges and PPAs into the near real-time, fast and furious world of managing your position dynamically. We deal in seconds, minutes and hours,

not days, months and years. But it is also about joining that long-term world to the short-term world. Eventually all long-term bets hit real time, and that is when we can help our customers manage their positions.

**Do customer needs vary depending on what role they play in the market?**

**Bance:** Their actual fundamental requirements are, perhaps surprisingly, very common, because they are all being driven, fundamentally, by the same trend. The shift towards more renewables connected to the system is driving increasing complexity, volatility and the need to handle both a lot more data, but also many different types of data.

One major distinction is the extent to which businesses may or may not have internal capabilities. Some have a significant amount of internal resources in technology. For those, we aim to provide the platform to let their internal heroes shine. Other energy businesses, which might be building out a fleet of assets with a wall of money, have very little internal capability. How do they even begin to use the latest digital solutions when previously all they did was deploy capital, build out assets and maybe rely on a route-to-market or PPA provider?

**How do your customers look to extract maximum value from the platform?**

**Bance:** One key goal for us is to try to provide easy-to-use mechanisms for clients' internal developers or quantitative

analysts to develop their own private applications running on our platform. If you imagine, in an app store, you have applications you get from a technology company, but you can develop your own private applications which are designed to run on top of that same piece of technology. In the same way, our customers can build and retain their own 'secret sauce' and differentiate against their competitors. But they still benefit from the elements of the technology stack that they are happy to share with others in the industry.

**Does that help in terms of reinforcing to trader users that they retain autonomy in their decision-making?**

**Bance:** We are strategically very clear that we are a technology company providing decision support, not displacing the decision-making, which needs to stay firmly with the client. We are not pretending that we know the markets or their assets or their customers better than they do.

We can make sense of the incredible data complexity, bridge between the physical world of assets and the financial world of markets and provide on a platter a curated set of potential decisions that should be pretty good decisions. But, ultimately, the decision is theirs, while the next module in our platform lets them execute those decisions with a high degree of quality. **PE**



Peter Bance,  
Origami CEO

**“Eventually all long-term bets hit real time”**

# Regulatory change transforms the trading landscape

**MARKETS** / The rise of intermittent generation is not the only agent of change in electricity markets. Rule changes can also have a significant impact / **Peter Ramsay, Editor-in-chief**

“When the single system price arrived, we were in the right place at the right time.” So says Phil Hewitt, director of software firm EnAppSys, of a game-changer in European power markets.

Interestingly, though, this shift in dynamics was not driven by the explosion in wind and solar generation, albeit that was a contributory factor and continues to assist growth in liquidity and participation. Instead, it was a tweak to the market structure that helped turn a previously sleepy backwater of the traded market into the hottest venue in town.



Phil Hewitt,  
director of  
EnAppSys

**How has increased renewables penetration changed the Great Britain (GB) and continental European traded power markets?**

**Hewitt:** When we started, everybody was trading out on the forward curve and intra-day was just balancing. Market actors were typically large organisations—like the ‘Big Six’ UK utilities or independent power producers like Drax. What they would do is hedge a lot of the power quite a way forward and aim to make a bit of money fine-tuning it in the balancing mechanism (BM).

They would have intra-day traders whose job it was to zero their imbalance position almost at any cost—it did not really matter, it was just a risk issue. Intra-day was very much the ‘unsexy’ part.

But power markets have become more difficult to predict. There was always a certain degree of difficulty even when temperature was the primary variable. But now intermittent generation is also dependent on the weather.

And that means it is more difficult to hedge further out. It also means that the previously junior intra-day trader is now actually at the sexy end of the business! On the forwards desk, traders used to make very small margins, but on very big volumes. Now, intra-day, you can make pretty big margins on small volumes.

That has also seen an explosion in smaller trading shops. The optimum size almost seems to be four guys in a room. For them, long-term is maybe week-ahead.

**Is this purely due to the rise of renewables?**

**Hewitt:** No, there is a regulatory change



**“Everybody was trading out on the forward curve and intra-day was just balancing”**

angle as well. The intra-day market really took off when we went to a single system price. Before that, if you ended the half or quarter-hour settlement period long, you got paid a lower price on that imbalance and, conversely, if you were short, you paid a high price to get back into balance.

But now it is a single price. And that means you can speculate against imbalance. That arrangement started in Germany and its adjacent markets, and then it spread into GB. But the issue with Germany and adjacent markets is that non-physical trading is something that has to be done via a route-to-market so you can hide in someone else’s portfolio, and lose some value as a result.

In GB, though, non-physical trading was always something you could do. It was always possible to take a position and run it through to imbalance. Before 2015, you would not do that, because if you were long or short, you took the hit of an unattractive price. But now, with the single price, you either go short or long in the market and make money.

**So, it is a radically different market to, say, a decade ago?**

**Hewitt:** Yes and, for whatever, reason,



many of the new breed of traders cut their teeth in Danish companies—Danske Commodities, Energi Danmark or Neas. They worked out there was money to make in Germany and by moving power across interconnectors before the European market really started to integrate through day-ahead market coupling.

Now they run 24/7 shift trading, continually monitoring almost every market in Europe. They have models running on every market and, when that model flags that a certain market is going to be interesting, that is what they focus on. It might be GB one day, France the next, Germany the day after.

They leave their algorithms running, making small amounts of money doing lots of very small intra-day trades for slim margins. But they focus attention on whatever market is particularly under stress or oversupplied.

Belgium is perhaps a good example—in the summer it can get significantly oversupplied. There is a lot of solar and offshore wind, while 50pc of its thermal generation is nuclear, which they cannot switch on and off easily. So, if your models say tomorrow is going to be an interesting day in Belgium, then you focus on Belgium, and moving Belgian power across interconnectors into adjacent countries.

#### **How have those changes impacted on the EnAppSys offering?**

**Hewitt:** We started off with settlement, which, while it was and remains very important to make sure you are paid correctly, is not as sexy as trading! So, our journey began not on the intra-day but

five working days in arrears. Then we got into BM reporting service (BMRS) fundamentals data and, for GB, started overlaying a lot of additional analysis on top of the BMRS.

Because, if you are trading in the GB market, the problem is too much transparency, you are processing half a million messages a day. With that information, the challenge is to distil it into a summary that allows people to understand it. Whereas, if you are trading in, say, the Netherlands, the problem is not enough transparency—you have to infer a lot of things from limited information.

The key thing was when we started overlaying system price calculations on top of the BMRS, telling people in real time how the system is evolving. From there, we developed an indication of what was driving the forward evolution of the system price, going beyond the current half-hour. And we added connections into the Epex exchange platform for live analysis of how everybody else in the market is reacting. We also have a model that monitors the day-ahead for day-ahead price forecasting, and now out to week-ahead too.

#### **Do you find that different types of market actor—utilities, trading houses, banks, new renewable generation entrants—want different things from your services?**

**Hewitt:** I actually think everybody's

moving in a fairly similar direction. If you take banks as an example, to some degree banks have exited the market. But the banks that remain might largely be trading assets on behalf of others. And, even if you are a supplier with no generation, which is now quite rare, you might have a lot of power-purchase agreements with small generators.

The exception might be pure suppliers. They might well not even bother with intra-day trading. A lot of start-up energy suppliers take a position on day-ahead, and imbalance is just a cost. Their focus

is on getting their systems to bill customers working correctly, they do not want to spend their money speculating in the market.

But all the power stations and all the players who have got stuff they can flex, they are all very active. And then it just depends on how much risk their middle office is prepared to take. They will try to extract

scarcity value from the BM when the system gets tight. When they are the last station on, they will try to make sure they get paid thousands of pounds per MWh. For the rest of the time they will constantly adjust their position in the wholesale market against their assets just to make small amounts of money.

And then you have just got these non-physical traders, who take floating positions and are quite happy to take these through to imbalance. They are a lot more comfortable with taking a position that is riskier. **PE**

**“Intra-day, you can make pretty big margins on small volumes”**



# Taking the short term to the long

**MARKETS** / The rise of renewables has revolutionised short-term trading. But that will have a feedback loop on the longer-term market / **Peter Ramsay, Editor-in-chief**

“When you look now at forward markets, you are not looking at trading multi-seasons at a time, you are looking at, effectively, lots of small intra-day decisions.” So says Rajiv Gogna, partner and development lead at consultancy LCP.

LCP began its power market analytics journey focused on the long-term outlook for the market, followed by analysing the intra-day, but the requirement to optimise on a continuous basis is driving an expansion of its offering. “The ambition is to join up the different parts of the curve in terms of no longer just looking at the intra-day itself, but rather looking at what does intra-day versus 20 years’ time look like” says Gogna.

## What has taken a long-term energy forecasting consultancy into short-term electricity analysis?

**Gogna:** The drivers are twofold—one is our technical capabilities: the overlap of mathematical abilities and development expertise, plus energy market experience. That is the internal reason why we can do what we are doing.

The slightly wider driver is the market itself. Our traditional client base, larger generators in the UK, have seen their business models shift to be more reliant on the intra-day market. Traditionally, you would sell your power over a longer-term horizon and lock in that spread, with demand levels being the only major variable. The deployment of renewables has meant those margins have decreased and market volatility has increased. Therefore, opportunity in the intra-day market has grown with almost all the players now looking at trading decisions very close to real-time. So, it is really driven by that client demand; people constantly asking us, ‘how do we move the decisions closer and closer?’ We effectively decided to build a product to do just that.

## What data are you collecting to support the product?

**Gogna:** Essentially, the key data we are collecting is around demand levels and

around expected generation—what power plants are doing, their status, whether they are available and functioning as expected. A big change in recent years is the increasing importance of European data. Flows on interconnectors, as we have increased this capacity, make quite an impact on what is going to happen in the UK.

Ultimately, it is about whether we can predict what prices will be doing and whether we can predict how sensitive they will be. To some extent, understanding the price sensitivity around a situation—if we are in a position where one power plant’s position could change and that could move the price significantly up or down—is as important as understanding the price itself.

## And how do you add value now that data collection has become easier through the availability of APIs?

**Gogna:** If you look at the sheer number of data sources at which you need to look, the bigger ones may have APIs that make things easier. But we are still looking at websites where you have to download spreadsheets via automatic programmes. These are things that traders would be having to do.

There is value in having all that information to in one place and for that information to be in the same format—bringing it into one central space that is actually

comparable rather than having a spreadsheet here and an API there, all at different granularities.

Beyond that, can you actually visualise that data? And, by that, I mean visualise different slices, be it geographically, over time, comparing assets, working out what happened historically versus what is happening. And you need that picture in sub-second granularity. The next stage is allowing users to be on top of what is important to them very quickly. We use live notifications, sounds, colours, the ability to push to phones.

We can create very quick analyses within our platform that can be repeated on new data. You can set up a view and you can immediately see not only what the situation is now, but what the situation was last week and how that compares between now and then.

The final element is forecasting what is about to happen. We take what we have learned from the energy market and also our own internal data science expertise and forecast where prices are going to be going for the next few hours

**“Understanding the price sensitivity around a situation... is as important as understanding the price itself”**



Rajiv Gogna, LCP partner



And that is really complicated. In the longer-term horizon, you can make fairly broad-brush assumptions on what the thermal or wind fleet might be doing. But, if you are looking at the next ten minutes, you need both a much clearer idea of exactly what those numbers are, but also those numbers' sensitivity.

It is about being able to integrate all the data and build models that are appropriate for each dataset. It is a very different technique trying to predict what a wind plant is going to do for the next two hours versus what an individual gas plant is going to do.

You need the ability to break down the forecast, use an appropriate approach for every element, which range from traditional energy modelling to newer machine-learning approaches, and then bring it all back together to ultimately give the user one price. But you are talking about a couple of thousand different inputs that we will be analysing at sub-second timescales to get users that one price.

#### **And you have now expanded beyond the intra-day market?**

**Gogna:** Part of it is the increasing need to understand both the short and long term. Gone are the days where you can make a long-term decision based on just being able to sell multi-year contracts. You need

to be comfortable with what the intra-day markets will be doing in a few years.

A significant expansion beyond our core intra-day trader customer base is, for one, working with wider teams. Traders are working less and less in isolation. They are working more closely with analysts, who in turn are thinking slightly more about historical and future trends. And we have introduced market-wide summary analysis: industry leader boards that people can use at board-level reporting on how their assets have done against others and being able to delve into competitor strategy.

#### **How has the UK market changed with the arrival of small-scale renewable generators and other actors, rather than being dominated by a limited number of integrated utilities?**

**Gogna:** In some ways, lots and, in other ways, not that much. Supported renewables have lowered the wholesale price, meaning that traditional generators are having to work harder to make money in the market. With the increase in deployment of other assets such as gas engines and batteries you see increased competition and, for 95pc of days, that will drive consumer efficiency because you are able to get that more competitive price. It has also meant there are a number of

options available to National Grid Electricity System Operator in terms of who it can call upon and different services that might help manage the system. It not just about providing power, it is backing up that power, voltage control, reserve services etc.

But we are still seeing, on extreme days, the historical 'Big Six' utilities, and particularly a couple of companies formed through the sale of their generation businesses, are able to really capitalise on those opportunities and set quite high prices, e.g. the £4,000/MWh+ pricing we have seen recently. To some extent, their experience and the size of their teams gives them the ability to potentially capitalise on opportunities that smaller players may not be able to.

But it is also driven simply by the size of the assets with which they are dealing. If you are a 1MW battery and it is a very cold day, you are not offering that much to National Grid. Whereas, if you are an 800MW gas-fired plant, if National Grid needs you, you can make a significant system impact and price accordingly.

I think another aspect is a lot of innovation across the sector—the emergence of trading desks that are data science-driven has led to much more real-time decision-making. Because algorithms are able to process those decisions quicker, again it drives optimal solutions. **PE**

# The rise of non-traditional actors

**MARKETS** / In the new world of decentralised generation, batteries, EVs and more sophisticated demand-side response, almost any organisation of size is potentially a power market participant / **Peter Ramsay, Editor-in-chief**

That large-scale integrated utilities are no longer the only show in town in Europe's electricity markets is relatively well-known. But what is less recognised is that even organisations—be they commercial, municipal or state-owned—where energy is far removed from their core purpose are turning towards optimising their power needs and, in many cases, also supply and flexibility.

And that has inspired Matt Nicholas, after over 15 years trading European gas and power, to found two firms, Watt3 in Switzerland and Twine Network in the UK, aimed at supporting these fledgling actors with a data-driven optimisation solution and as an energy services company (Esco).

## What customers do your businesses serve?

**Nicholas:** To summarise, it is about servicing customers that have a certain amount of demand to play with, a certain amount of their own production and a certain amount of flexibility—and potentially storage—and therefore the ability to distribute backwards and forwards. And how does that customer then optimise all the components it has in its system?

We can create, for example, across the whole of Germany, highly localised weather forecasts specific to a customer's assets—down to the village level or even more localised than that. And if we know it will be a cold morning or a foggy morning, that has a demand implication or, if solar is involved, a supply implication. We can integrate that with all other data—historical supply and demand data, spot price data from the exchanges, price curves, data inputs specific to customers like grid tariffs or frequency response if the client is in that market.

All of that is fed into a neural network which calculates, based on those inputs and working off a seven-day weather fore-



Matt Nicholas,  
founder of Watt3  
and Twine Network

## “How does the customer optimise all the components it has in its system?”

cast, what you want to do over the next 24-hour timeframe. But we can also optimise this for the next 15 years, giving insight into meeting net-zero commitments.

### So it is a very different type of customer than what we might think of as a traditional power market actor?

**Nicholas:** Even the developer of an apartment block could be a client. Because maybe it wants to install solar and a battery and link these up, creating value. And maybe it wants to give each of the individual tenants in its 100-apartment block a daily bill according to what power they used, as a ‘smart home’ service. And there is the potential to integrate electric vehicles (EVs) as well. An obvious client is anyone that has a large network, MWs rather than kW, of variable consumption and production.

### And how does the UK look different to Switzerland?

**Nicholas:** The UK is in some ways moving more slowly than Switzerland. For example, while Swiss local authorities were waking up to this three-or-four years ago, it is only very recently the UK local authorities—many of which have legally binding commitments to meet decarbonisation targets—have started to think about what they are actually going to do.

And the same goes for other public bodies such as fire authorities—which have potential for solar and are also looking at electric fire engines—or the rail network—given the relatively large demand of railway stations but also their potential for both solar and battery/flexibility management.

Let me give a couple of real-world examples. Take a recycling centre, which has quite high demand from breaking materials down, but that demand can be profiled at certain times. It has office space housing quite a few workers. It has also invested in a Tesla battery and has a fleet of four large Tesla Model X100Ds and three other electric cars, two of them hybrids. That is a system that can be optimised, even locally as a microgrid.

And remember that, in the UK from 2025, there will be no more gas boilers in new homes, potentially only heat pumps. We have been talking to a housing developer and a data centre, where they want to put the data centre onto the housing estate, giving them power, cooling, and heating options between the individual homes and the data centre. The challenge again being, how do you optimise all of this?

That is the key part. There are other services we can provide, such as evaluating investment in something like solar or in EVs. And there will increasingly be an ESG reporting aspect at the other end—you took certain decisions, and this is how it turned out in reality. But the optimisation piece sits in the middle, all delivered via an Esco. **PE**

# Old dogs learn new tricks

**MARKETS** / The founders of Energy Quantified by Montel have built analysis models before. But this time they have torn up the rulebook / **Peter Ramsay, Editor-in-chief**

This is not the first rodeo for Hugo Birkelund. His team over the past 20 years has built power market forecasting capabilities first for brokerage Natsource—which evolved into the power element of the Point Carbon analysis service—and then the platform MKOnline for Norwegian market information provider Markedskraft, now renamed Value Insight.

But, as he tells *Petroleum Economist*, changes in the market have meant that, as part of Norway's Montel power market news and analysis provider, it is not a case of replicating previous experiences but completely rethinking the approach.

## What has been different about the Energy Quantified journey?

**Birkelund:** Montel is a one-of-a-kind company in that it simply said, 'do whatever you want, but be good at it'. That is the kind of opportunity that you do not get many times during your life. So, we started Energy Quantified with the objective to reshape what we did and how we did it.

To give an example, we had someone approach us who had an idea on doing something smart in hydrology. So, we took him on and we built a completely new hydrology model. It is fair to say that what took eight years to do in our previous workplaces took eight months to do in the new environment.

And that is not because we copied what had done before—it is a completely new set-up—just that we were able to have several guys working in a focused and modern data environment. The resulting new hydro system offers much higher spatial and resolution, and we believe it is far better suited for connecting the short-term and long-term power markets with hydro information.

## What is the focus of what you are doing?



Hugo Birkelund, CEO of Energy Quantified

## “[Smaller players] want a level playing field in terms of access to data”

**Birkelund:** We saw at a previous employer that people bought our forecasts even though they were better at it than we were. So we asked: “Why are they buying our service? There must be something else.” And the answer to that is, we think, the driver for Energy Quantified. We excel in providing the best possible starting point data-wise for our customers, with a pan-European offering covering Portugal to Finland to Turkey.

## Is that need there because the data is still not perfect?

**Birkelund:** When you pull in all the available data, you realise that it is often very poor in many respects. In fact, we need to model this data—if you think of a forecast, we call what we do a backcast. From a statistical viewpoint, data is wrong; for

example, while we might call them actuals, they really are not. These actual numbers are often calculated by whoever is responsible. And while some of those for doing it in certain countries do a fantastic job, others are extremely poor at it. On top of the curated data, we have built a comprehensive system for providing forecasts for all variables.

Providing the data in a modern framework was our next task. For that purpose, we built an easy-to-use Excel interface, and a Python/API option for advanced users.

And we have done the hard yards in things like reconciling naming conventions throughout Europe. Everything is consistent; for example, we have reconciled resolution to 15 minutes as standard. What we do creates a consistency for both the customers who need data for the short term and for a longer timeframe. It saves them time and money.

The biggest companies may have the competence to do this internally. But the trend in the power markets for a number of years now has been for many more, smaller

players to also come into the market. And they want a level playing field in terms of access to data.

## What about price forecasting?

**Birkelund:** We also have a pan-European spot model—again completely different from previous efforts and which enables us to much better estimate the price sensitivity of the market—but it is probably what we have put least work into thus far. I think the concept is fantastic and, now we have greater manpower, we can start to improve on it.

But our customers are incredibly IT-savvy, often with doctorates in mathematics or some such. Their first need is for a cutting-edge solution to get the data. It is not price formation, because they are going to build their own systems. **PE**