Mark-to-Market, Profit and Loss

Building Your Own P&L Calculation

Introduction

You know your positions. You've calculated net exposures, separated physical from financial, and tracked delta and hedge ratios. Now comes the question every trader, risk manager, and executive asks:

Are we making or losing money?

That's what mark-to-market P&L tells you. It values your positions at current market prices and shows whether you're sitting on paper gains or paper losses—before any trades have actually settled.

Why P&L is Harder Than Positions

In the companion guide *Position Aggregation and Delta Exposure*, we learned that calculating positions is straightforward: sum signed quantities, group by commodity and delivery period, and you're done. The input data (your trades) is clean, static, and under your control.

P&L calculation is messier:

1. **You need market data:** Current prices for every commodity and delivery period you're exposed to
2. **Market data goes stale:** Yesterday's prices are wrong today—and you won't know until you refresh
3. **Multiple curves exist:** Physical trades might use one price curve, financial hedges another
4. **Data sources conflict:** ICE says £25/MWh, your broker says £25.50, your ETRM cached £24.80
5. **Attribution is ambiguous:** Did P&L change because prices moved, or because you added trades?

Despite these challenges, P&L is non-negotiable. It's the foundation for:

- Daily risk reporting (are we within limits?)
- Trading performance measurement (did this strategy work?)
- Senior management oversight (are we making money this quarter?)
- Regulatory reporting (EMIR requires daily valuation)

A Common Scenario

Tuesday morning, gas desk. The COO walks in: *"I need to understand our P&L movement. We were up £180k yesterday, now we're down £45k. What happened overnight?"*

The trader checks the ETRM. The P&L report shows:

Total Unrealized P&L: £45,120

One number. But the COO needs:

- Which commodities drove the loss? (Was it gas, power, or both?)
- Which delivery periods? (Near-term or far-dated?)
- Was it price moves, or did we add losing trades?
- How much is unrealized vs realized?

The ETRM vendor says the P&L attribution module "will be included in the Q3 release." The meeting is in 20 minutes.

What do you do?

This guide teaches you how to calculate mark-to-market P&L from first principles—the mechanics that sit behind every ETRM's P&L module. You'll learn:

- How to value positions using current market prices
- The difference between unrealized P&L (paper gains/losses) and realized P&L (locked in)
- Why positive positions profit from price rises, negative positions from price falls
- How to track daily P&L changes and attribute them to price moves vs new trades
- The common data quality pitfalls that corrupt P&L calculations

How This Guide Works

This guide builds directly on *Position Aggregation and Delta Exposure*. We'll use **the same 6-trade reference portfolio** from that guide, so you can see how positions flow into P&L calculations.

If you haven't read the position guide yet, you should. This guide assumes you understand:

- Signed quantities (Buy = +, Sell =)
- Position aggregation (grouping trades by commodity, delivery, and book)
- Physical vs financial book separation
- Delta exposure and hedge ratios

Recommended approach: Complete the position guide first, then return here to add the P&L layer.

The structure:

- **Section 1:** Mark-to-market P&L formula and mechanics
- **Section 2:** Complete workflow from positions to P&L

- **Section 3:** Advanced topics (multi-layer P&L, attribution, VaR)

Note on units and conventions: Like the position guide, we use **MWh** for consistency. UK gas is traded in therms; power in MWh. We'll note conversions where relevant, but focus on the universal P&L mechanics that apply regardless of units.

1. Mark-to-Market P&L

The last piece: **are we making or losing money?**

What is Mark-to-Market?

Simple version: Mark-to-market means "what's it worth right now?" If you bought gas at £25/MWh last week, and it's trading at £27/MWh today, your position is worth £2/MWh more. That's your unrealized gain—profit you'd lock in if you closed the trade today.

Formally: **Mark-to-market** (MTM) means valuing your trades at today's market prices, not the prices you originally traded at.

If you bought gas at £25/MWh last week, and the market is now £27/MWh, your position has gained £2/MWh in value. If the market drops to £23/MWh, you've lost £2/MWh.

Mark-to-market P&L captures these **unrealized** gains and losses—the theoretical profit or loss if you closed all your positions today.

Realized vs Unrealized

Before we go further, here's a common source of confusion:

Realized P&L	**Unrealized P&L (MTM)**
Trade is closed and settled	Trade is still open
Cash has moved (in/out of bank)	Theoretical (mark-to-market)
Profit/loss is locked in	Changes as market prices move
Appears on financial statements	Used for risk management
Historical fact	Current position value

Why report unrealized P&L? Because:

- **Daily risk management:** Your risk manager needs to see daily P&L, not just wait until trades settle months later.
- **Risk limits:** Most desks have daily or weekly P&L limits (e.g., "no more than £10k loss per day").
- **Margin calls:** If your unrealized losses grow too large, the exchange will demand more collateral.
- **Performance tracking:** Traders are evaluated on mark-to-market P&L, not just realized gains.

For the rest of this section, when we say "P&L" we mean **unrealized mark-to-market P&L.**

The Formula

The mark-to-market P&L formula is deceptively simple:

Golden Formula #3: Mark-to-Market P&L

$$\text{MTM P\&L} = (\text{Market Price} - \text{Trade Price}) \times \text{Signed Quantity}$$

Where:

- **Market Price:** Current market price for the commodity and delivery period
- **Trade Price:** Price agreed when the trade was entered
- **Signed Quantity:** +Q for Buy, $-Q$ for Sell

Why signed quantity? The sign arithmetic handles direction automatically:

- Buy (+100) and prices rise (+5): $(+5) \times (+100) = +500$ profit
- Buy (+100) and prices fall (−5): $(-5) \times (+100) = -500$ loss
- Sell (−100) and prices rise (+5): $(+5) \times (-100) = -500$ loss
- Sell (−100) and prices fall (−5): $(-5) \times (-100) = +500$ profit

Key Insight

MTM P&L = (Market Price − Trade Price) × Signed Quantity. This shows unrealized gain/loss on open positions. Signed quantities handle the direction automatically: buy low/sell high = profit, regardless of whether you're long or short.

Worked Example: Single Trade

A realistic example with current UK gas market prices.

Trade details:

Field	Value
Action	Buy
Commodity	NBP Gas
Quantity	100 MWh
Trade Price	£25/MWh
Delivery	January
Signed Quantity	+100 MWh

You entered this trade in November when NBP was trading around £25/MWh.

Market today:

It's now late December. A cold weather forecast has pushed NBP gas prices up 8% to £27/MWh.

Calculate MTM P&L:

$$\text{MTM P\&L} = (27 - 25) \times 100 = +£200$$

Interpretation: You have an **unrealized profit of £200.** If you closed this position today

(sold 100 MWh at £27), you'd lock in a £200 gain. But the trade is still open, so this is a theoretical gain.

Quick Check

Calculate the MTM P&L for this trade:

Trade:

- Action: Sell
- Quantity: 200 MWh UK baseload power
- Trade Price: £65/MWh (entered in October)
- Signed Quantity: −200 MWh

Market today: £60/MWh (dropped due to mild weather and high wind generation)

Hint: Use the Golden Formula #3. Remember that selling means negative signed quantity, and the formula handles the direction automatically.

Answer:

$$\text{MTM P\&L} = (60 - 65) \times (-200) = (-5) \times (-200) = +£1{,}000$$

You sold high at £65, and the market has dropped to £60. If you closed today (bought back at £60), you'd lock in a £1,000 profit. The negative signs cancel out: you sold (−200), and the price moved in your favor (−5), so you profit.

Multiple Trades: Building a P&L Report

Using our reference portfolio from Sections 2–3, let's calculate MTM P&L. We'll use realistic market prices: NBP January has risen to £27/MWh, and NBP February to £26/MWh.

Our 6-trade portfolio with trade prices:

ID	Book	Del.	Signed Qty	Trade Price	Market
TR-001	Physical	Jan	+500	£25	£27
TR-002	Physical	Jan	−300	£26	£27
TR-003	Hedge	Jan	−150	£25.50	£27
TR-004	Physical	Feb	+400	£24	£26
TR-005	Physical	Feb	−320	£25	£26
TR-006	Hedge	Feb	−60	£24.50	£26

Calculate MTM P&L for each trade:

ID	Trade Price	Market	Diff	Signed Qty	MTM P&L
TR-001	£25	£27	+£2	+500	+£1,000
TR-002	£26	£27	+£1	−300	−£300
TR-003	£25.50	£27	+£1.50	−150	−£225
TR-004	£24	£26	+£2	+400	+£800
TR-005	£25	£26	+£1	−320	−£320
TR-006	£24.50	£26	+£1.50	−60	−£90
				Total P&L:	**+£865**

Total unrealized P&L: +£865.

Aggregated P&L by Book

Separate the P&L by Physical and Hedge books. This shows whether your hedges are working as intended.

Trade ID	Book	MTM P&L
TR-001	Physical	+£1,000
TR-002	Physical	−£300
TR-004	Physical	+£800
TR-005	Physical	−£320
Physical Book Total:		**+£1,180**
TR-003	Hedge	−£225
TR-006	Hedge	−£90
Hedge Book Total:		**−£315**
Net P&L:		**+£865**

What this tells you:

- Your **physical book** gained £1,180. NBP gas prices rose in both January and February (good for your net long physical positions).
- Your **hedge book** lost £315. The hedges moved against you—but that's exactly what hedges do. They offset most of the physical gains.
- **Net P&L: +£865.** This is the unhedged portion making money. Remember your delta exposure from Section 3? The 50 MWh January delta and 20 MWh February delta both moved in your favor. Roughly: 50 MWh × £2 = £100 (Jan), plus 20 MWh × £2 = £40 (Feb), plus gains from the physical trades you closed. The math isn't exact because trade prices varied, but the pattern holds: unhedged positions drive net P&L.

This is the beauty of separating physical and hedge P&L: you can see that the hedges are working (offsetting most of the physical movement), and only your intentional unhedged positions contributed significantly to net P&L.

Why Small Net P&L is Often Good

If you're fully hedged, you'd expect **small net P&L**—physical gains offset by hedge losses (or vice versa). A large net P&L often means:

- You have significant unhedged exposure (intentional or accidental).
- Your hedges aren't properly matched to your physical positions.
- There's basis risk (e.g., you hedged NBP but have TTF physical exposure).

For a conservative risk-managed desk, seeing +£400 on a portfolio this size is reasonable—it reflects deliberate delta exposure, not wild speculation.

Calculate Portfolio MTM P&L

Calculate the total MTM P&L for these trades:

Trades:

ID	Commodity	Signed Qty	Trade Price	Book
T1	NBP Gas	+200	£25	Physical
T2	NBP Gas	−180	£25.50	Hedge
T3	UK Power	−300	£63	Physical
T4	UK Power	+280	£62	Hedge

Market prices:

- NBP Gas: £26/MWh
- UK Power: £61/MWh

Answer:

ID	Calculation	MTM P&L	Book
T1	$(26 - 25) \times 200$	+£200	Physical
T2	$(26 - 25.50) \times (-180)$	−£90	Hedge
T3	$(61 - 63) \times (-300)$	+£600	Physical
T4	$(61 - 62) \times 280$	−£280	Hedge
	Physical Total:	+£800	
	Hedge Total:	−£370	
	Net P&L:	**+£430**	

Extension

You're monitoring P&L during a volatile trading day. At 9:00 AM, NBP gas is £27/MWh. By 2:00 PM, it's dropped to £25/MWh. Your portfolio:

Trade	Signed Qty	Trade Price
Buy (Physical)	+500 MWh	£26
Sell (Hedge)	−400 MWh	£26.50

Questions:

1. What was your MTM P&L at 9:00 AM (when NBP = £27)?
2. What's your MTM P&L at 2:00 PM (when NBP = £25)?
3. How much P&L did you *lose* between 9 AM and 2 PM? (Hint: This is your "P&L swing")
4. Your risk limit is "no more than £400 P&L swing in a single day." Did you breach it?

This is how traders monitor intraday P&L volatility. Risk managers set limits on both absolute P&L and P&L swing (the change during the day), because large swings indicate unhedged exposure to price movements.

Real-Time P&L Monitoring

In practice, market prices change constantly. Using the same portfolio from the Extension exercise above, traders monitor MTM P&L throughout the day:

- **9:00 AM:** NBP at £27, portfolio P&L +£300

- **11:00 AM:** NBP drops to £26.50, portfolio P&L +£250
- **2:00 PM:** NBP falls further to £25, portfolio P&L +£100

The P&L moves with the market. Notice how it dropped from +£300 to +£100 (a £200 swing)—but this stayed within the £400 risk limit from the Extension exercise. If it moves too far (hits a risk limit), the trader might hedge more to reduce exposure.

This is why you need to be able to calculate MTM P&L quickly—you can't wait for your ETRM's nightly batch job when prices are moving fast.

A note on price types: The prices used for real-time monitoring (**intraday** or **live prices**) are continuous market quotes from broker screens or exchange APIs. These differ from **settlement prices** (or **end-of-day prices**), which are official closing prices published by exchanges at market close—typically used for end-of-day P&L reporting and margin calls. For intraday risk management, you need live price feeds. For official books and records, you use settlement prices. Most discrepancies between "my P&L" and "ETRM P&L" come from using live prices at 2 PM vs waiting for the 5 PM settlement print.

What We've Built

You now have all the pieces to answer the three questions from the introduction:

1. **What's my net position?** → Section 1: Aggregate by commodity/delivery/book
2. **How much is hedged?** → Section 3: Delta exposure and coverage metrics
3. **Am I making money?** → Section 4: Mark-to-market P&L

In the next section, we'll put all of this together into a complete workflow that takes you from raw trade data to a full exposure and P&L report—the report your ETRM couldn't deliver at 8:30 AM.

2. Putting It All Together: The P&L Workflow

Using the same reference portfolio from the position guide, let's walk through how to add P&L calculation on top of position aggregation.

Recap: Positions from Guide 1

From *Position Aggregation and Delta Exposure*, we calculated these positions:

Commodity	Delivery	Book	Net Position
NBP Gas	January	Physical	+200 MWh
NBP Gas	January	Hedge	−150 MWh
NBP Gas	February	Physical	+80 MWh
NBP Gas	February	Hedge	−60 MWh

Now we'll value these positions and calculate P&L.

Step 1: Fetch Current Market Prices

You need market prices for each commodity/delivery combination. These might come from:

- Exchange settlement prices (ICE, EEX)
- Broker quotes
- Your ETRM's curve database

For our example, current NBP prices:

- January: £27/MWh
- February: £26/MWh

Step 2: Calculate Trade Prices

For each position, calculate the weighted average trade price. Using our reference trades:

NBP January Physical:

- TR-001: Buy 500 @ £25 = £12,500
- TR-002: Sell 300 @ £26 = −£7,800
- Net: +200 MWh for £4,700
- Weighted avg: £4,700 / 200 = £23.50/MWh

NBP January Hedge:

- TR-003: Sell 150 @ £25.50 = −£3,825
- Weighted avg: −£3,825 / −150 = £25.50/MWh

NBP February Physical:

- TR-004: Buy 400 @ £24 = £9,600
- TR-005: Sell 320 @ £25 = −£8,000
- Net: +80 MWh for £1,600
- Weighted avg: £1,600 / 80 = £20/MWh

NBP February Hedge:

- TR-006: Sell 60 @ £24.50 = −£1,470
- Weighted avg: −£1,470 / −60 = £24.50/MWh

Step 3: Calculate Unrealized P&L

For each position: (Market Price − Trade Price) × Position

Com.	Period	Book	Pos.	Trade £	Market £	Diff	P&L
NBP	Jan	Physical	+200	23.50	27.00	+3.50	+£700
NBP	Jan	Hedge	−150	25.50	27.00	+1.50	−£225
NBP	Feb	Physical	+80	20.00	26.00	+6.00	+£480
NBP	Feb	Hedge	−60	24.50	26.00	+1.50	−£90
					Total Unrealized P&L:		**+£865**

Step 4: Aggregate and Report

Sum P&L by book, commodity, or any dimension needed:

By Book:

Book	P&L
Physical	+£1,180
Hedge	−£315
Total	**+£865**

By Delivery Period:

Period	P&L
January	+£475
February	+£390
Total	**+£865**

You're sitting on £865 of unrealized profit. If you closed all positions at current market prices, you'd lock in this gain.

Final Reports

Exposure Report:

Commodity	Period	Physical	Hedge	Delta	Coverage %
NBP Gas	January	+200	−150	+50	75%
NBP Gas	February	+80	−60	+20	75%

P&L Report:

Book	MTM P&L
Physical	+£1,180
Hedge	−£315
Total	**+£865**

This is what your risk manager needed at 9 AM.

Your ETRM showed one aggregated number. You built this complete picture—with delta exposure by period, coverage metrics, and separated P&L—because you understand the fundamentals.

In a real desk with 2,500 trades, the workflow is identical. The only difference is scale: Python or Excel handles the arithmetic, but you're applying the same logic you've practiced with these 6 trades.

3. Advanced Topics (Optional)

You've mastered the core concepts: position aggregation, delta exposure, and mark-to-market P&L. This section briefly introduces advanced topics you'll encounter as you progress in energy trading.

These topics are beyond the scope of this guide. Consider this a preview of what comes next, not a comprehensive treatment.

Forward Curves and Mark-to-Market

So far, we've used a single market price per commodity (e.g., NBP gas = £27/MWh for January delivery). In practice, markets trade multiple forward periods simultaneously:

Delivery Period	Market Price
January	£27/MWh
February	£26/MWh
March	£25/MWh
Q2 (Apr-Jun)	£23/MWh
Q3 (Jul-Sep)	£22/MWh

This is called a **forward curve**—a set of prices for different future delivery periods.

When marking positions to market, you need to match each trade to the correct point on the forward curve. A January trade uses the January price (£27), a February trade uses the February price (£26), and so on.

Why this matters:

- If you have positions spread across multiple months, your total P&L is the sum of each month's individual MTM P&L.
- Forward curves shift constantly. A cold weather forecast might spike January prices (+10%) while leaving February unchanged. Your P&L will reflect this asymmetric movement.

Further learning: Forward curve construction, seasonality, contango vs backwardation.

Cross-Commodity Exposure

We've kept commodities separate (NBP, TTF, UK Power). But in practice, some commodities are correlated:

- **Gas and Power:** If gas prices rise, power prices often follow (gas-fired generation sets the marginal price in many markets).
- **NBP and TTF:** Both European gas markets, often move together due to LNG flows and pipeline interconnections.
- **Crude oil and refined products:** Brent crude vs diesel vs gasoline.

When calculating delta exposure, you might want to express everything in terms of a single risk factor. For example:

- "What's my total gas-equivalent exposure?" (combining NBP + TTF)
- "What's my total energy exposure?" (combining gas + power + oil)

This requires correlation analysis and risk factor modeling—beyond simple position aggregation.

Further learning: Correlation matrices, principal component analysis (PCA), risk factor decomposition.

Value-at-Risk (VaR)

Mark-to-market P&L tells you your current gain or loss. **Value-at-Risk (VaR)** tells you how much you could lose tomorrow if the market moves against you.

For example:

- You have +200 MWh NBP delta (unhedged long position).
- Historical data shows NBP prices move up or down by £2/MWh on 95% of days.
- Your 1-day 95% VaR is: $200 \times 2 = £400$.

This means: "With 95% confidence, I won't lose more than £400 tomorrow."

Why VaR matters:

- Risk limits are often set in VaR terms (e.g., "desk VaR cannot exceed £50k").
- Regulators and auditors require VaR reporting for financial risk management.

- VaR helps size positions: if your risk limit is £50k and NBP volatility is £2/MWh, your max delta is 25,000 MWh.

Further learning: Historical VaR, parametric VaR, Monte Carlo simulation, conditional VaR (CVaR).

Scenario Analysis and Stress Testing

Beyond VaR, you can ask: "What if gas prices spike 20%? What's my P&L?"

This is **scenario analysis**:

1. Define a scenario (e.g., NBP +20%, TTF +15%, Power +10%).
2. Recalculate MTM P&L using the shocked prices.
3. See how your portfolio performs under stress.

Common scenarios:

- **Cold winter:** Gas and power prices spike.
- **Supply outage:** A major pipeline or power plant goes offline.
- **Renewable surge:** High wind/solar generation crashes power prices.
- **Currency shock:** GBP/EUR moves sharply, affecting cross-border trades.

Further learning: Stress testing frameworks, regulatory stress tests (e.g., Prudential Regulation Authority scenarios).

Intraday P&L and Real-Time Risk

We've focused on end-of-day reports. But during the trading day, prices move constantly. Intraday P&L tracking requires:

- Real-time market data feeds (updated every minute or faster).
- Automated position updates as traders execute new deals.
- Live dashboards showing P&L, delta, and VaR updating in real time.

This is where Python automation (Section 7) is necessary. You can't manually recalculate P&L every 5 minutes.

Further learning: Streaming data pipelines (Kafka, KSQL), real-time analytics, low-latency systems.

Counterparty Credit Risk

Throughout this guide, we've treated trades as certain—if you bought 500 MWh, you'll receive 500 MWh. But what if your counterparty defaults?

Counterparty credit risk is the risk that the other party to your trade fails to deliver (physically or financially).

Examples:

- You bought 1,000 MWh of gas from Supplier A for January delivery at £25/MWh. The market price is now £30/MWh. If Supplier A goes bankrupt before delivery, you'll need to buy replacement gas at £30—a £5,000 loss.
- You sold a hedge (futures contract) to Counterparty B at £27/MWh. The market moves to £22/MWh. Counterparty B owes you £5/MWh in cash settlement. If they default, you don't receive the payment.

Why this matters:

- Your position report shows +500 MWh from Supplier A. But if Supplier A is financially distressed, that position carries credit risk—it might not materialise.
- Risk managers track *exposure by counterparty*: "How much are we owed by Counterparty X? What's our maximum loss if they default?"
- Mitigation strategies include: credit checks, collateral agreements (margin calls), trading through exchanges (central clearing), and diversifying counterparties.

Further learning: Credit risk modeling, netting agreements (ISDA), margin and collateral management, central counterparties (CCPs).

P&L Attribution: Delta vs Execution

This guide showed you how to calculate total MTM P&L (market price − trade price). But experienced traders split P&L into two components:

- **Delta P&L:** Gain/loss from positions you held overnight (the market moved)
- **Execution P&L:** Gain/loss from trades you executed today (you traded better/worse than the market)

Example:

- Yesterday close: NBP Feb = £27/MWh. You held +100 MWh overnight.
- Today open: NBP Feb = £28/MWh. Your position gained £1/MWh × 100 MWh = **£100 delta P&L**.
- During the day: You sold 50 MWh at £27.80/MWh (below market). You lost £0.20/MWh × 50 MWh = **-£10 execution P&L**.
- Today close: NBP Feb = £28.50/MWh.

Two approaches to split P&L:

1. **Approach 1 (preferred):** Delta P&L = last night's delta × today's curve change. Execution P&L = trades × (close − trade price).

2. **Approach 2:** Delta P&L = tonight's delta × curve change. Execution P&L = (close − open) × traded volume.

Why this matters: Delta P&L tells you if you're positioned correctly. Execution P&L tells you if you're trading well. Different skill sets, different accountability.

Further learning: P&L explain tools, daily P&L reconciliation, trader performance attribution.

Hedging Forecasts (Changing Exposures)

This guide assumed fixed positions. But retail utilities and generators hedge *forecasts* that change daily:

- **Retailer:** Customer demand forecast updates every day (weather, holidays, industrial patterns). Yesterday you expected 10,000 MWh for February. Today's forecast says 10,500 MWh. Your unhedged exposure just grew by 500 MWh.
- **Generator:** Wind farm output forecast changes hourly (weather models). Your hedge position stays static, but your natural exposure shifts constantly.

The challenge: Your "delta" is now a moving target. You can be 100% hedged at 9 AM and 90% hedged at 3 PM because the forecast changed, not because you traded.

Further learning: Rolling forecast hedging, automated rebalancing, forecast vs actual reconciliation.

Options and Dynamic Delta

This guide treated delta as static. But if your portfolio includes options, delta changes as the market moves:

- A call option with delta = 0.5 means "if the market moves £1, the option value moves £0.50."
- As the market price approaches the strike price, delta shifts (0.3 → 0.5 → 0.7).
- Your portfolio's total delta is constantly changing without any trades.

Example: You're hedged (delta = 0) at market price £27/MWh. The market rises to £30/MWh. Your call option's delta shifts from 0.4 to 0.8. You're now long 0.4 deltas (40% of notional) without trading.

Further learning: Greeks (delta, gamma, theta, vega), dynamic hedging, volatility trading.

Multi-Currency Portfolios (FX Risk)

This guide assumed single-currency portfolios (GBP). But many firms trade across markets:

- NBP gas (GBP), TTF gas (EUR), Henry Hub gas (USD)
- Positions in three currencies, P&L in GBP

The problem: Your TTF position might be flat (delta = 0 in EUR), but if EUR/GBP moves, your GBP P&L changes. You have **FX risk** on top of commodity risk.

Example:

- TTF position: +1,000 MWh at €25/MWh (flat delta in EUR)
- EUR/GBP = 0.85 (1 EUR = 0.85 GBP)
- In GBP: +1,000 MWh at £21.25/MWh
- If EUR/GBP moves to 0.90, your GBP position value changes even though TTF prices don't move

Solution: Either (1) hedge FX separately with currency forwards, or (2) accept FX risk as part of your trading strategy.

Further learning: FX hedging, cross-currency P&L, quanto options.

What We've Covered

This section previewed advanced topics you'll encounter as you progress:

- Forward curves and multi-period MTM P&L
- Cross-commodity exposure and correlation
- Value-at-Risk (VaR) for forward-looking risk
- Scenario analysis and stress testing
- Intraday P&L and real-time risk monitoring
- Counterparty credit risk
- P&L attribution (delta P&L vs execution P&L)
- Hedging changing forecasts (retail/generation)
- Options and dynamic delta (Greeks)
- Multi-currency portfolios and FX risk

Each of these topics could be a full guide on its own. For now, focus on mastering the fundamentals. Once you're comfortable with position aggregation, delta, and MTM P&L, you'll have the foundation to tackle these advanced concepts.

Summary: Key Takeaways

You now understand how to calculate and track mark-to-market P&L in energy trading.

Core Concepts

- **Mark-to-market P&L** values your positions at current market prices, showing paper gains or losses before settlement
- **The formula:** Unrealized P&L = (Market Price Trade Price) × Position
- **Sign matters:** Long positions profit from price rises, short positions profit from price falls
- **Unrealized becomes realized** when trades settle or you close positions with offsetting trades

Why P&L is Harder Than Positions

- **Fresh market data required:** Stale prices = wrong valuations
- **Multiple curves:** Physical trades and financial hedges may use different price curves
- **Data conflicts:** Sources disagree, and you must choose which to trust
- **Attribution ambiguity:** Separating price moves from new trades requires tracking both

The Workflow

1. Calculate positions (Commodity + Delivery + Book)
2. Fetch current market prices for each position
3. Calculate unrealized P&L = (Market Price Weighted Avg Trade Price) × Position
4. Aggregate P&L by book, commodity, delivery period
5. Track daily changes and attribute to price moves vs new trades

Real-World P&L Management

- **Fast P&L** (real-time): Traders need instant feedback for intraday decisions
- **Human P&L** (trader estimate): End-of-day reconciliation with manual adjustments
- **Accurate P&L** (official): Back-office reconciled, auditable, reported to senior management

Each layer serves different needs. Fast P&L tolerates approximations for speed. Accurate P&L demands perfect reconciliation but can lag by hours or days.

The Golden Formula

Unrealized P&L

$$\text{Unrealized P\&L} = (\text{Market Price} - \text{Trade Price}) \times \text{Net Position}$$

Where:

- **Market Price** = current price for that commodity and delivery period
- **Trade Price** = weighted average price you traded at
- **Net Position** = signed quantity (from position aggregation)

Why This Matters

- **Risk management:** Daily P&L shows whether positions are within loss limits
- **Performance measurement:** Did your trading strategy make money?
- **Regulatory compliance:** EMIR requires daily mark-to-market valuations
- **Cash flow reality check:** Unrealized gains don't pay bills—you need realized P&L to fund operations

What You've Mastered

You can now:

- Calculate mark-to-market P&L from a portfolio of trades
- Separate unrealized (paper) gains from realized (locked-in) P&L
- Track daily P&L changes and attribute them to price moves vs new trades
- Identify data quality issues (stale prices, wrong curves) that corrupt valuations
- Understand multi-layer P&L systems (Fast/Human/Accurate)

The Foundation is Complete

Between the two guides (*Position Aggregation and Delta Exposure* + *Mark-to-Market P&L Calculation*), you now understand the core mechanics that sit inside every ETRM system:

1. **Trade capture:** Record trades with commodity, delivery, price, quantity, book
2. **Position aggregation:** Sum signed quantities by commodity + delivery + book
3. **Delta exposure:** Calculate unhedged risk (Physical + Financial)
4. **Mark-to-market:** Value positions at current market prices
5. **P&L tracking:** Monitor daily changes and attribute to causes

These fundamentals are universal. Whether you're working with ETRM vendors (Allegro, Endur, RightAngle), building custom Python tools, or reconciling positions manually in Excel, the mechanics are the same.

Master these, and you understand the foundation of energy trading risk management.

About Jordan Dimov

Portfolio CTO and energy trading software specialist with over 20 years of software engineering experience and 7 years in the energy commodities sector. Based in London since 2011, working through A115 Ltd, a London-based contracting and consulting company.

Previous roles include trading platform development at Shell, Centrica Energy, and Limejump, delivering systems for front office trading, middle office risk management, and back office settlement across gas, power, and environmental markets.

Professional Services

Individual & Team Training

- Energy trading bootcamps for software engineers
- ETRM development training for technical teams

Technical Consulting

- Architectural review and validation sprints
- Code review and technical assessment
- Bespoke energy trading software development

Business Development

- Strategic advisory for energy trading technology firms
- Investor relations support in the energy trading sector

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