Seasonal Gas Storage & Carry — A Beginner’s Guide

This short guide explains the ideas behind “inject now, withdraw in winter” for European gas (TTF/NBP). It covers seasonality, spreads, costs, the theory of storage, a simple decision rule, and risks. It’s written for newcomers and avoids heavy math.

1) Seasonality & the seasonal spread

Gas demand is seasonal. Summer (injection season) typically has lower demand; winter (withdrawal season) typically has higher demand. Futures prices often reflect this: winter delivery is usually priced above summer. Seasonal spread = Winter price − Summer price (€/MWh). This spread is the starting point for storage economics: if you can buy in summer, store, and sell in winter, the spread might pay for your costs and leave a margin. (See CME Group’s natural gas seasonality & spreads primers.)

2) What actually earns (or loses) money

Your net carry P&L per MWh is approximately: Net P&L ≈ (Winter − Summer) − Storage fees − Inject/withdraw costs − Loss% × Winter − Financing (optional) • Storage fees: reservation/usage fees for capacity. • Inject/withdraw costs: variable charges for moving molecules in/out. • Loss% (fuel/gas lost): multiply by the (higher) winter sell price. • Financing: cost of capital while gas is in storage (optional in simple models). Breakeven is when Net P&L = 0. Traders often require a trigger margin above breakeven before acting.

3) Theory of storage (intuition)

The classic “theory of storage” links inventories to forward curves: • High inventories → market tends to contango (deferred > nearby), low spot volatility; futures premiums can rise toward full carry (financing + storage). • Tight inventories → market tends to backwardation (nearby > deferred), higher spot volatility; the “convenience yield” from holding physical is higher. Convenience yield = the benefit of having molecules on hand (operational flexibility, security of supply). It moves inversely with inventories. (See Investopedia on cost-of-carry and convenience yield; Wikipedia “Theory of storage”.)

4) A simple decision rule (config-driven)

Given a config with fees and losses: • Breakeven line = fees + inject/withdraw + (loss% × Winter). • Trigger line = Breakeven + safety margin (e.g., +0.50 €/MWh). Action: • If (Winter − Summer) > Trigger → bias to store (“bull carry”). • If (Winter − Summer) < Breakeven → don’t store (or unwind). This is not optimization; it’s an explainable checklist widely used for commercial decisions.

5) Worked example (toy numbers)

Suppose Summer = 30 €/MWh, Winter = 36 €/MWh → Spread = 6. Costs: storage fee 1.2; inject/withdraw 0.8; loss 1.5% of Winter ≈ 0.54. Breakeven = 1.2 + 0.8 + 0.54 = 2.54 €/MWh. Trigger = 2.54 + 0.50 = 3.04 €/MWh. Net P&L ≈ 6 − 2.54 = 3.46 €/MWh (above trigger → store).

6) Sensitivity to winter price

Because the loss term uses Winter, and your sale price is Winter, P&L is sensitive to Winter moves: • If Winter rises +10% (to 39.6), Spread = 9.6; Loss = 0.594; Net ≈ 9.6 − (1.2 + 0.8 + 0.594) = 6.99 €/MWh. • If Winter falls −10% (to 32.4), Spread = 2.4; Loss = 0.486; Net ≈ 2.4 − (1.2 + 0.8 + 0.486) = −0.086 €/MWh → below breakeven. This shows why bullish winter risks (cold weather, LNG outages) support carry, while mild forecasts/lots of supply can kill it.

7) Practical inputs you’ll need

• Prices: front-winter and front-summer (or Q1 vs Q3/Q4) daily settles. • Fees/costs: storage tariff info (€/MWh), variable inject/withdraw, expected fuel/loss%. • Policy/ops: storage fill mandates, maintenance schedules, capacity availability. • Scenario/risks: weather forecasts (HDDs), LNG arrival outlook, pipeline/production reliability, policy changes.

8) Common pitfalls

• Ignoring losses: applying loss% to the wrong leg (use the sale leg). • Double-counting costs or forgetting variable charges. • Using stale fees or unrealistic loss parameters. • Treating big backwardation as “free money” without operational/credit limits. • Failing to include a trigger margin above breakeven (slippage/uncertainty).

9) Where this maps to real trading

European gas desks constantly weigh storage vs. prompt sales. Seasonal carry (summer→winter) is among the core commercial calls. Your notebook automates the arithmetic: plots the spread, overlays breakeven & trigger, and prints today’s expected P&L/unit and a bias/invalidator line suitable for a daily note.

References (introductory, accessible)

• CME Group – “Understanding Natural Gas Risk Management: Spreads & Storage” (seasonality, calendar spreads). • CME Group – “Introduction to Natural Gas Seasonality”. • Investopedia – “Cost of Carry”. • Investopedia – “Convenience Yield”. • Wikipedia – “Theory of storage”.

(These are broad primers for intuition; exact European tariffs/fees come from operator documentation.)

Disclaimer

This primer is educational and simplified. It omits credit, operational constraints, optionality (e.g., multi-cycle caverns), and detailed financing. Always validate fees, losses, and logistics with your storage provider and risk team before acting.