Applying FTRs to Hedge Strategy

Greg Sise
Energy Link Ltd

Supported by Transpower

September 2010

What the devil is an FTR?

$$Payout = Quantity \times (H_B - H_A)$$

- Some of the details ...
  - H_B and H_A are spot prices
    - » they could be GWAP hub prices
    - » or they could be the prices at OTA and BEN to match the ASX's futures contracts, for example
  - Quantity is a MW or MWh value which scales the basic payout
    - » select the quantity to fit your particular hedging needs
  - Like our familiar CFDs, the payout is purely cash
  - Payouts are calculated half hourly, and settled monthly
  - Payouts are from the losses and constraints excess (LCE, or rentals)
  - We only consider obligation FTRs today (option FTRs another day)

Energy Link
DECISION POWER

The If's and But's

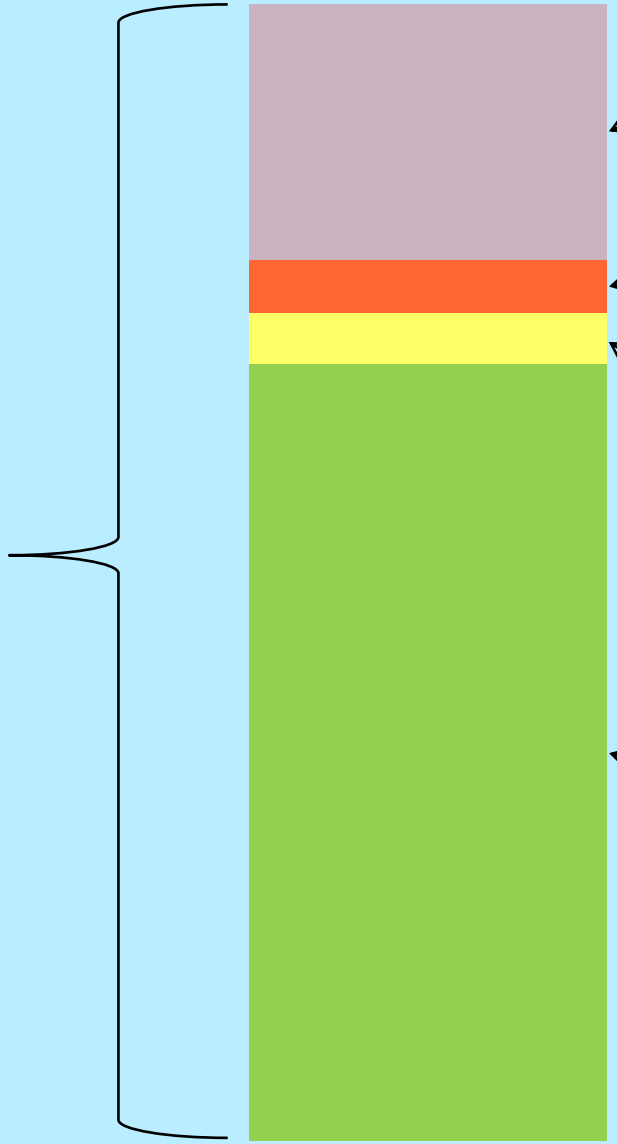
- Introduce the concept of the "loss factor" L_{AB} into the payout
  - a number between 1.00 and 1.0X
  - reduces the payout on the FTR

$$Payout = Quantity \times (H_B - L_{AB} H_A)$$

- Why do this?
- The impact of losses on the price difference H_B - H_A is a function of the cost of losses and the loss rentals
- Details on the next slide ...

Energy Link
DECISION POWER

Loss Costs and Loss Rentals



Total payments by purchasers

Constraint rentals may be present

Loss rentals: proportional to losses

Cost of the losses: proportional to losses

Cost of delivered energy

Loss Costs and FTRs

This is the amount created by the price differences, eg $H_B - H_A$

This is the amount available to fund FTRs

This amount is 'missing' in the NZ market

- Hence the total payout on FTRs must be scaled down
- One method is to introduce a loss factor > 1
- There could be other methods ...

Energy Link
DECISION POWER

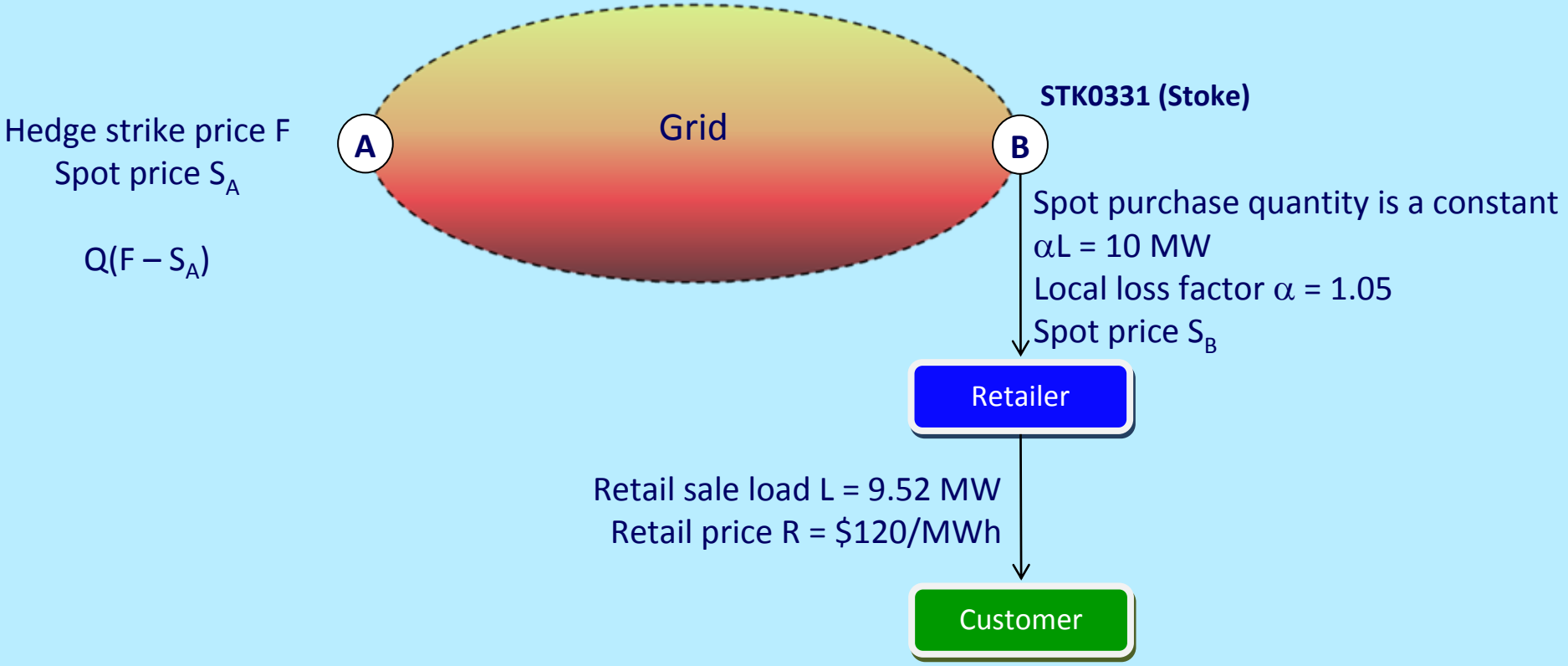
Scenarios Considered

- Our reports considered 5 scenarios:
  - Independent retailer
  - Large Consumer
  - Merchant generator
  - Gentailer
  - Financial intermediary

- We have time to focus on one only, the Independent Retailer

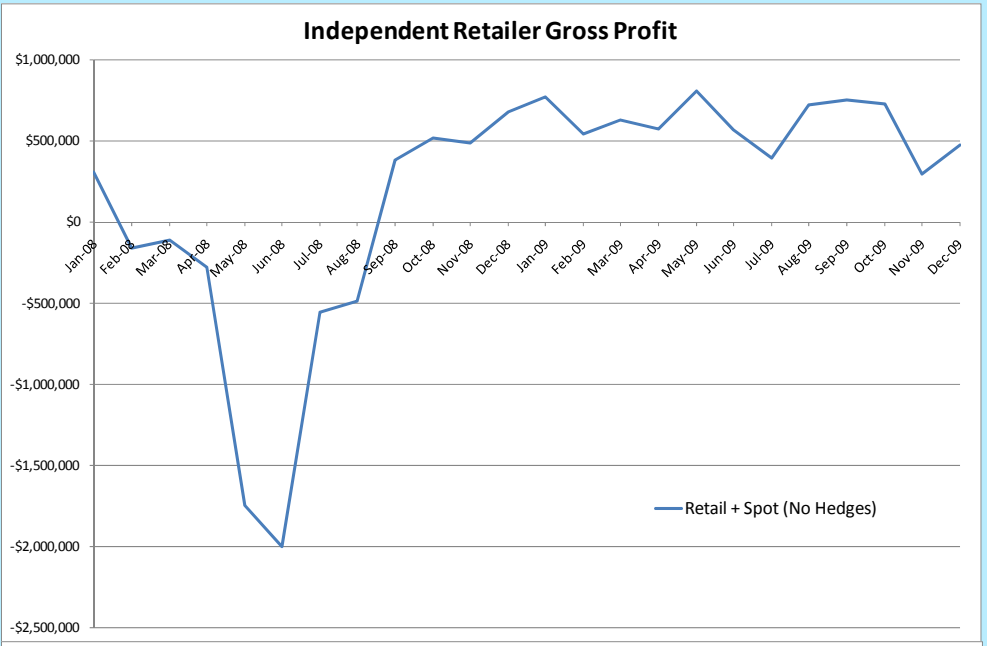
Energy Link
DECISION POWER

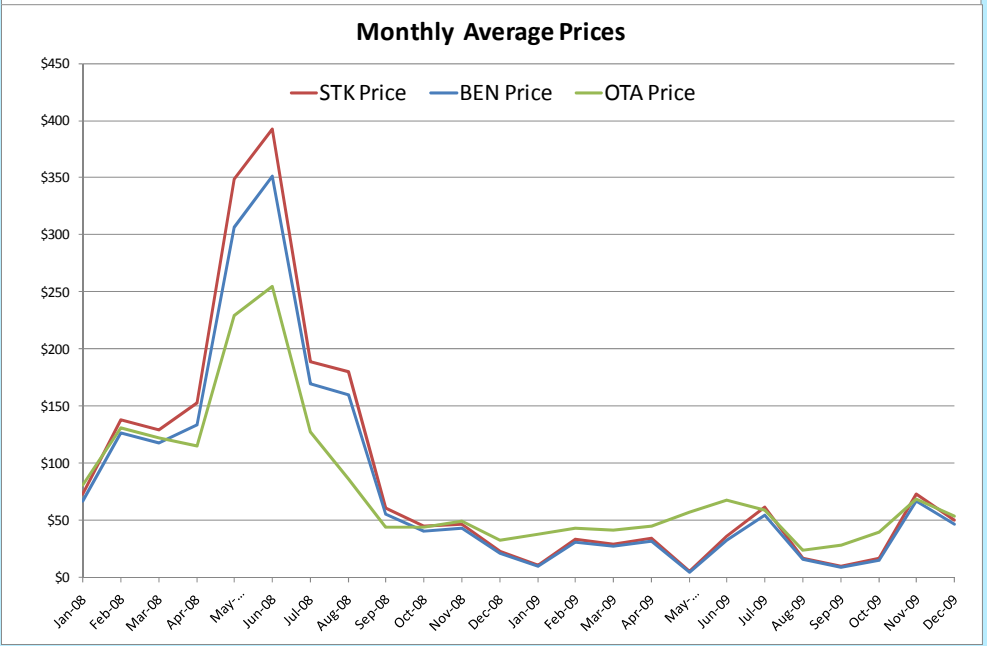
Independent Retailer at STK0331 (Stoke)



- Gross profit = retail sales RL – spot purchase αLS_B

Raw Spot Exposure – Monthly Gross Profit

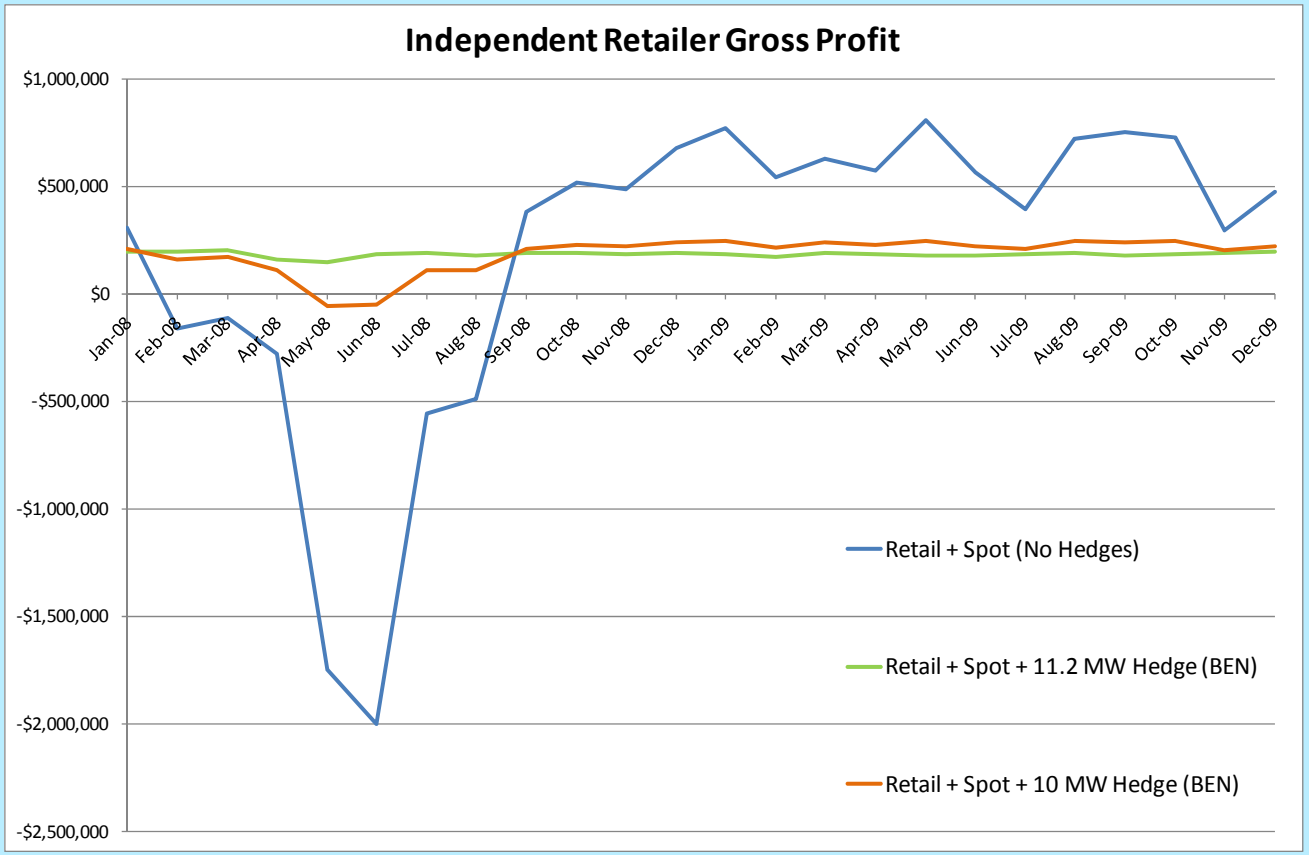




2008 and 2009 chosen because of the wide range of prices, and a large number of constraints on flow between the GWAPs

Energy Link
DECISION POWER

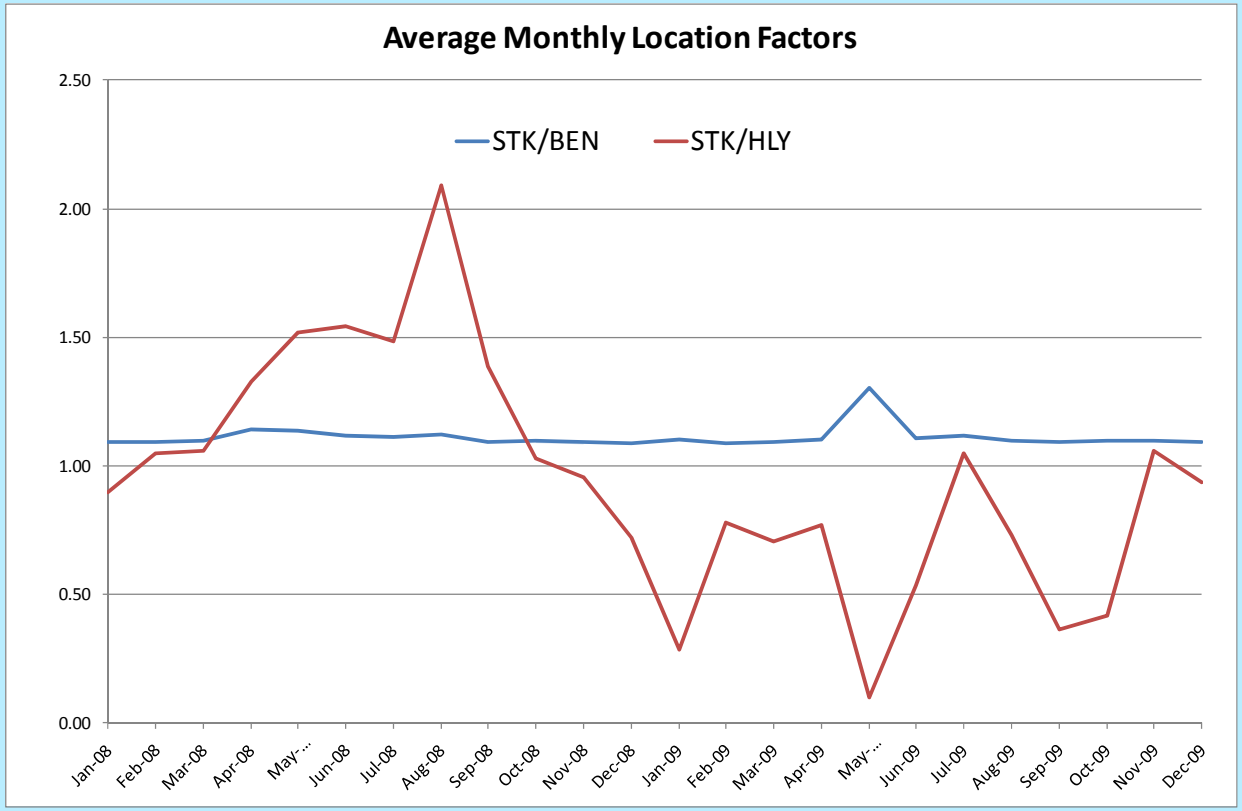
Add a Hedge at Benmore



- Buying a 10 MW hedge at BEN still gives losses in May & June 2008
- Location factor adjustment: adjusting the hedge quantity by the expected location factor (1.12) gives 11.2 MW and less volatile GP

Energy Link
DECISION POWER

Monthly Average Location Factors

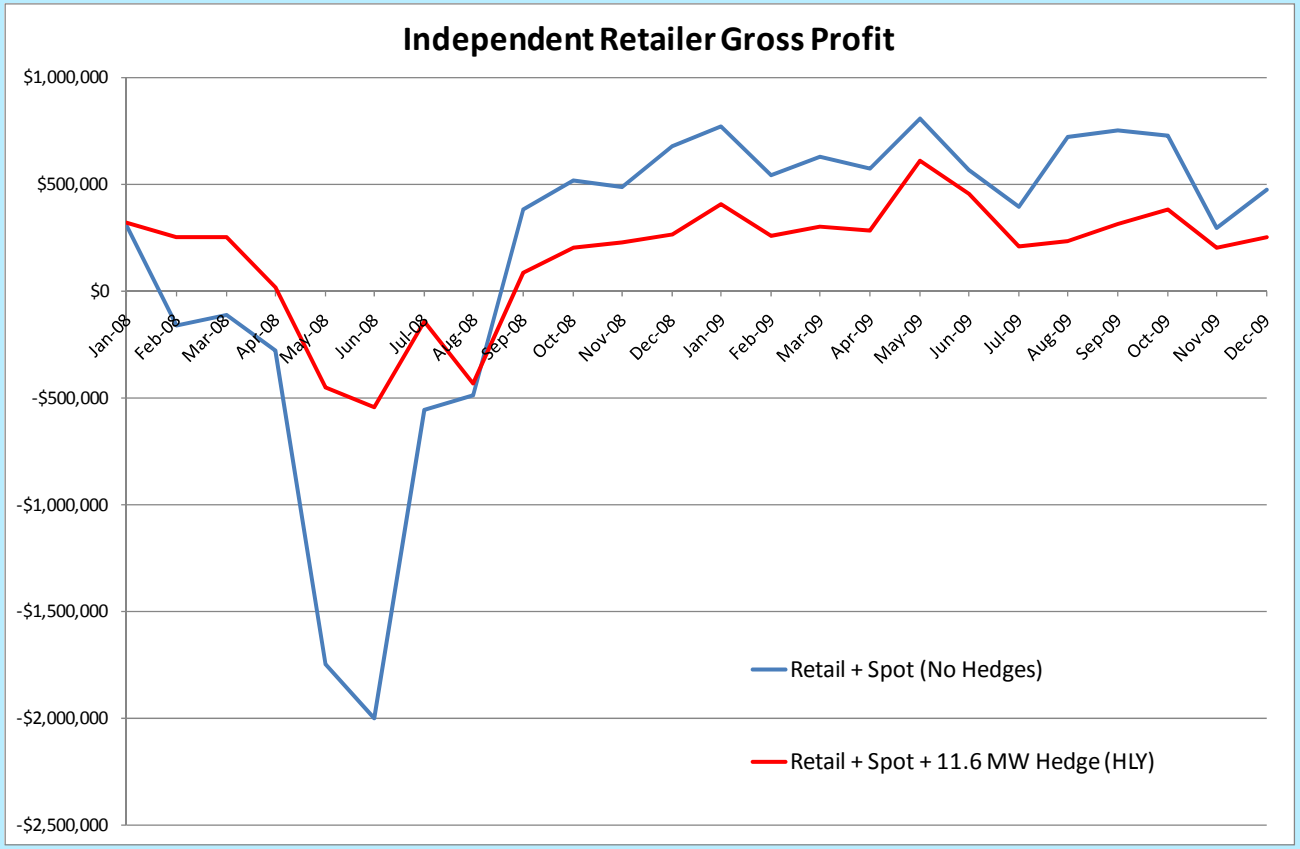


Location factors are calculated using average prices (**not** average location factors)

- Location factor adjustment performs well when the location factor is relatively stable
- This is not the case between the islands

Energy Link
DECISION POWER

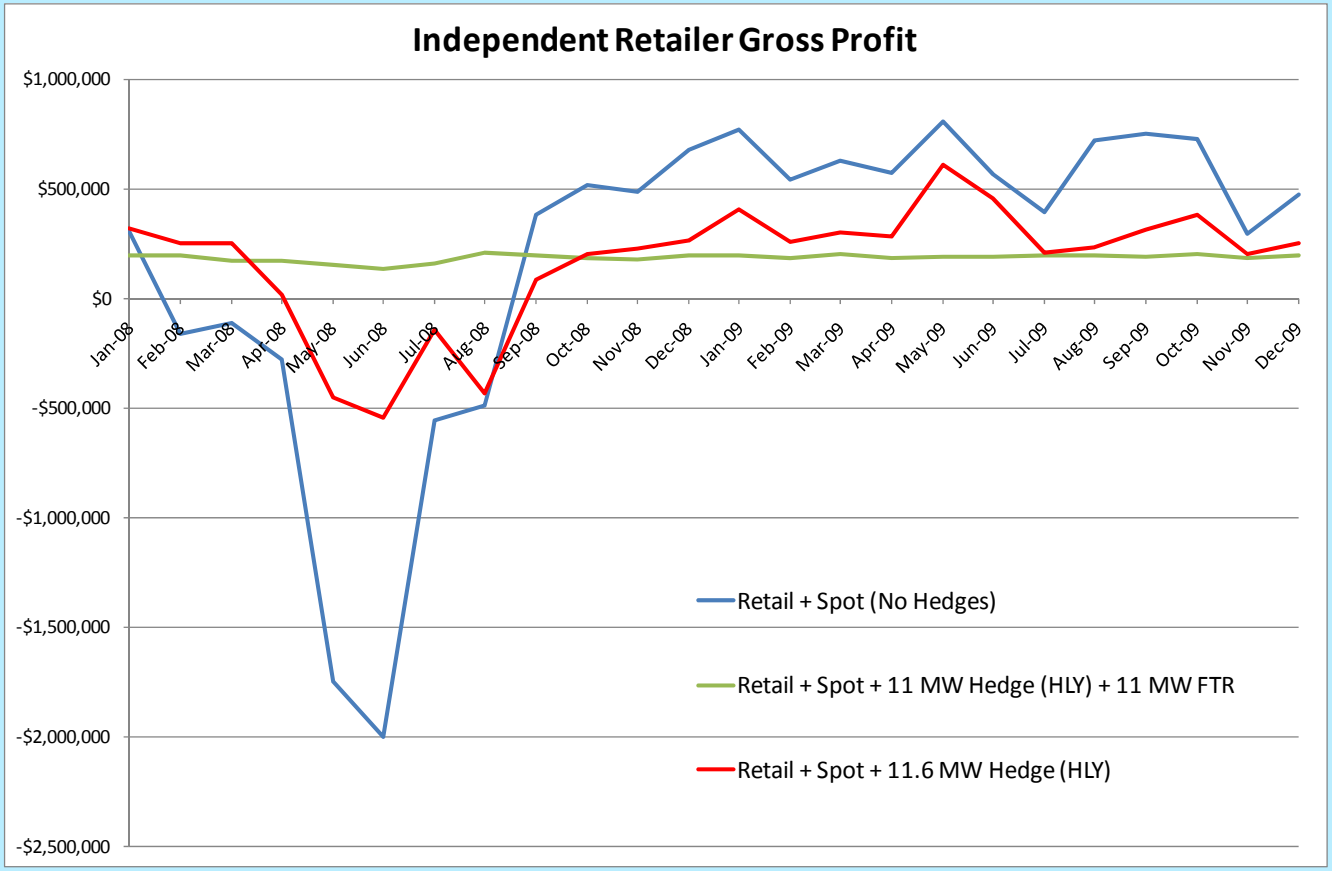
Or Add a Hedge at Huntly



- Hedging in the other island performs poorly, even with the appropriate location factor adjustment of 1.16 on the quantity hedged at HLY

Energy Link
DECISION POWER

Hedge at Huntly + FTR



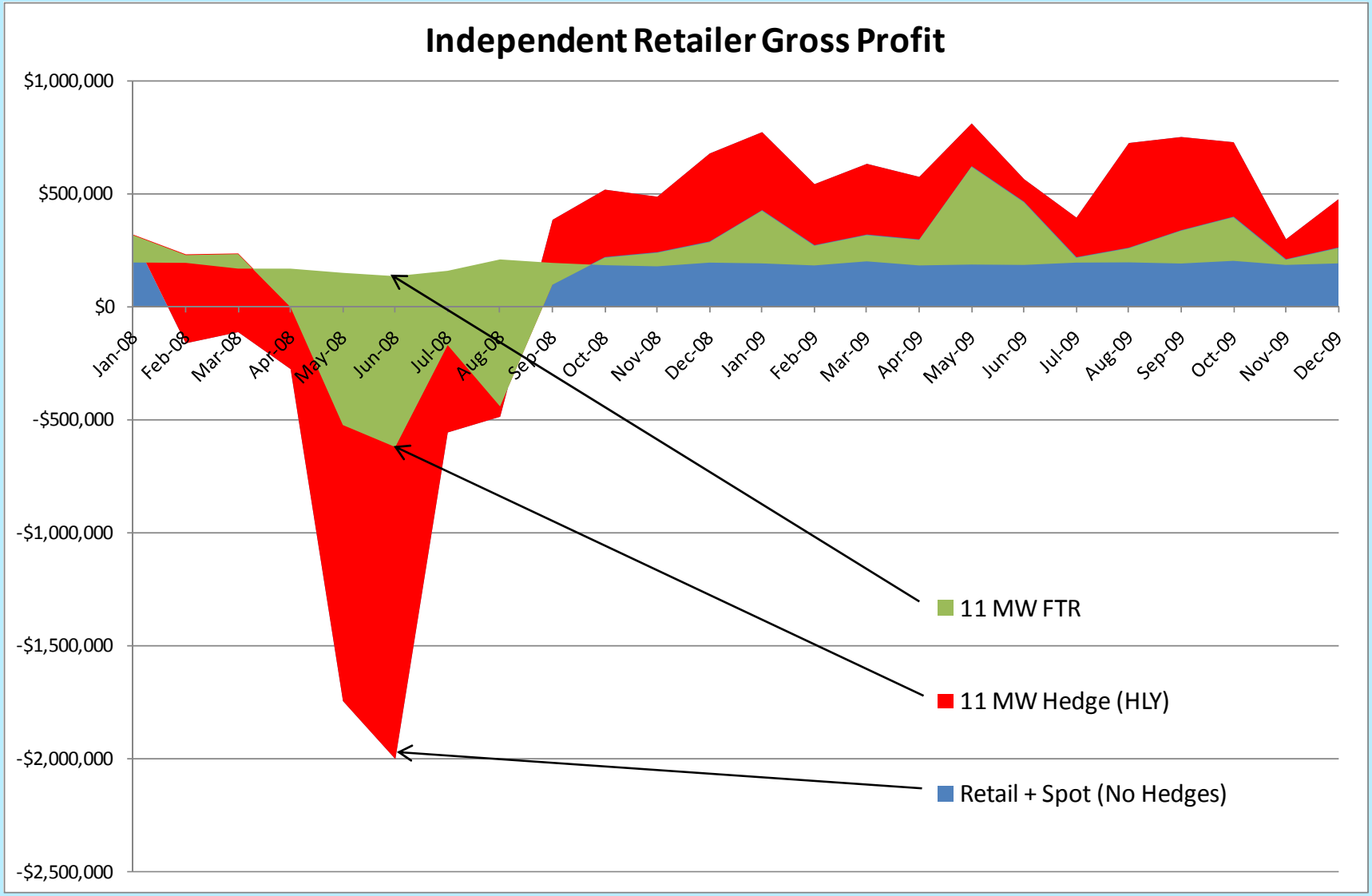
FTR significantly reduces GP volatility

- The optimum hedge and FTR quantity (11 MW) are set according to the formula

$$Quantity = \overline{\alpha L}\left[\frac{\hat{S}_B}{\overline{H}_B + \overline{S}_A - \overline{H}_A}\right]$$

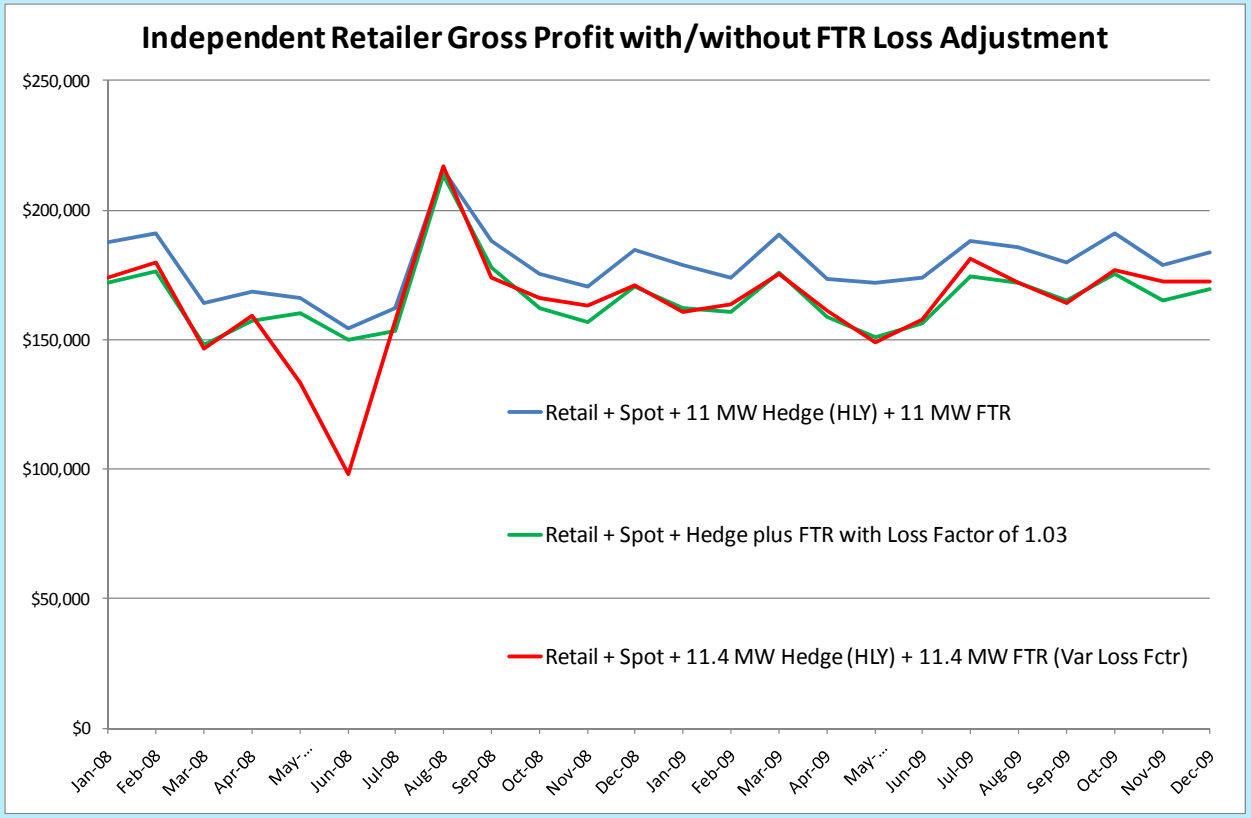
Energy Link
DECISION POWER

Hedge at Huntly + FTR: Components



Energy Link
DECISION POWER

Loss-adjusted FTRs



Note the error in the example in our Summary report

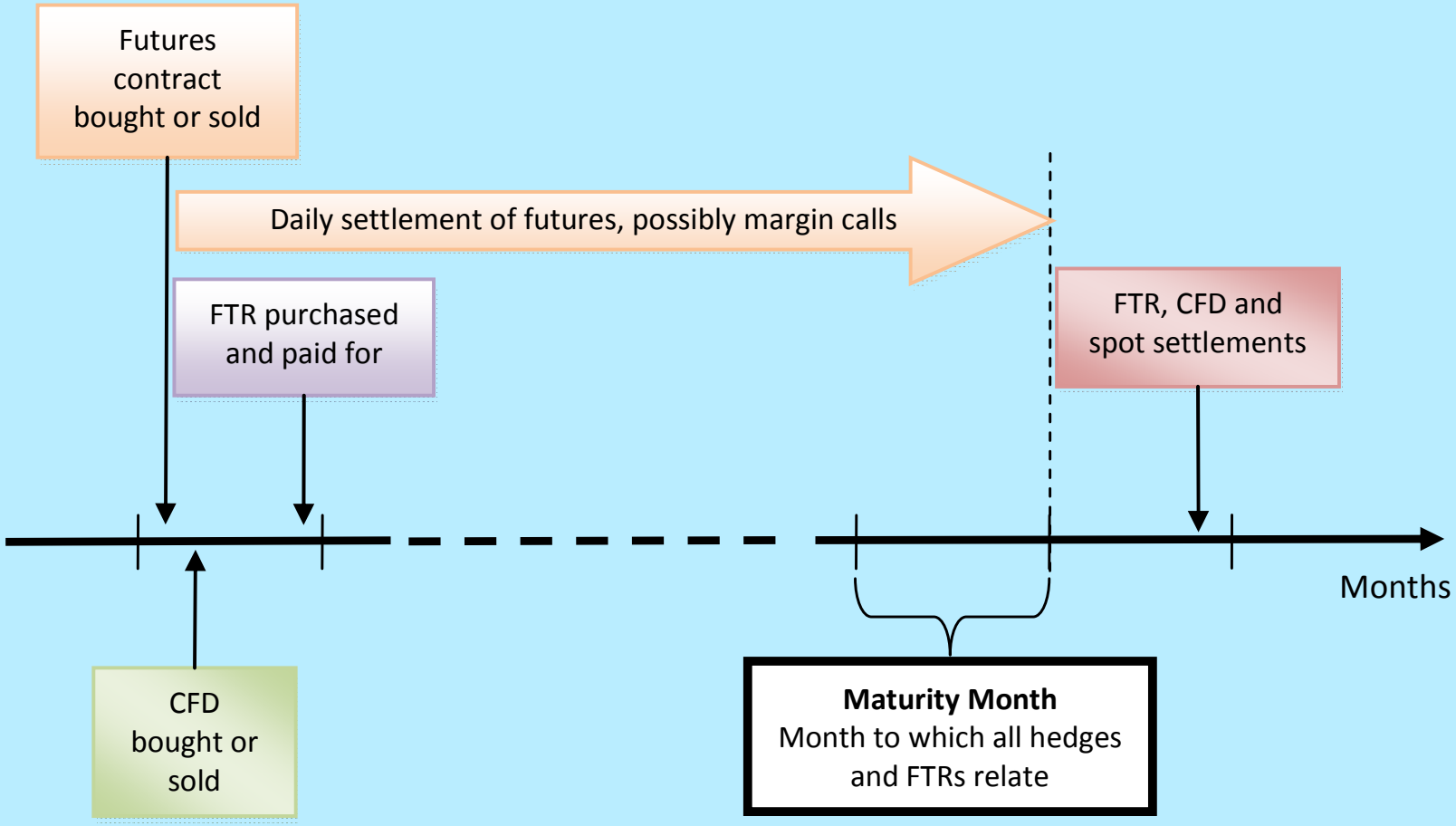
$$Quantity = \overline{\alpha L}\left[\frac{\hat{S}_B}{\overline{H}_B + \overline{S}_A - L_{AB}\overline{H}_A}\right]$$

Incomplete GWAP and HVDC data mean the variable loss factor scenario is not as accurate as it could be

- In the final FTR design, loss factors may or may not be present
- Loss factor > 1 exposes the retailer to the price impact of losses
- If they are present, they may vary over time depending on power flows
  - loss factors in the example average 1.028, 99th percentile is 1.080

Energy Link
DECISION POWER

Timing of Cash Flows



Cash flows are subject to final FTR design

Energy Link
DECISION POWER

Basis Swaps and FTR Payout Equivalence

- A ‘basis swap’ can be constructed from the sale and purchase of two CFDs at different nodes, covering the same period
  - e.g. buy an OTA futures and sell a BEN futures for October 2011

- This has a number of important implications in respect of FTRs:
  - If market power is an issue for FTRs, then it is also an issue for the futures market
    - » monitoring: if an FTR is purchased when there is no risk to hedge (ala SOL), and there is market power to be used, that could indicate a potential market power issue
  - Hedge market liquidity may be enhanced by providing an alternative means to hedging inter-island LPR, thus creating extra confidence in the supply of LPR hedges

- It would be “neat” if FTRs and futures used the same prices, either GWAPs or nodal prices

Energy Link
DECISION POWER

Pricing an FTR

- In principle, the price of an FTR (when it is purchased) is set by the expected price difference $E[\Delta H] = E[H_B - H_A]$

- This could be calculated using forecasts of the two prices

- OR, the payout equivalence of basis swaps and FTRs raises the possibility of using the price difference between OTA and BEN futures as a first point of reference for pricing FTRs, and vice versa