Introduction to US Co-products

September/October 2011

What makes up a kernel of corn?

A Kernel of Corn
(#2 Yellow Dent)

Germ (Corn Oil) 1.5 lb/Bu
Starch 32 lb/Bu
Gluten (60% protein) 2.5 lb/Bu
Fiber 11.5 lb/Bu
Water 8.5 lb/Bu
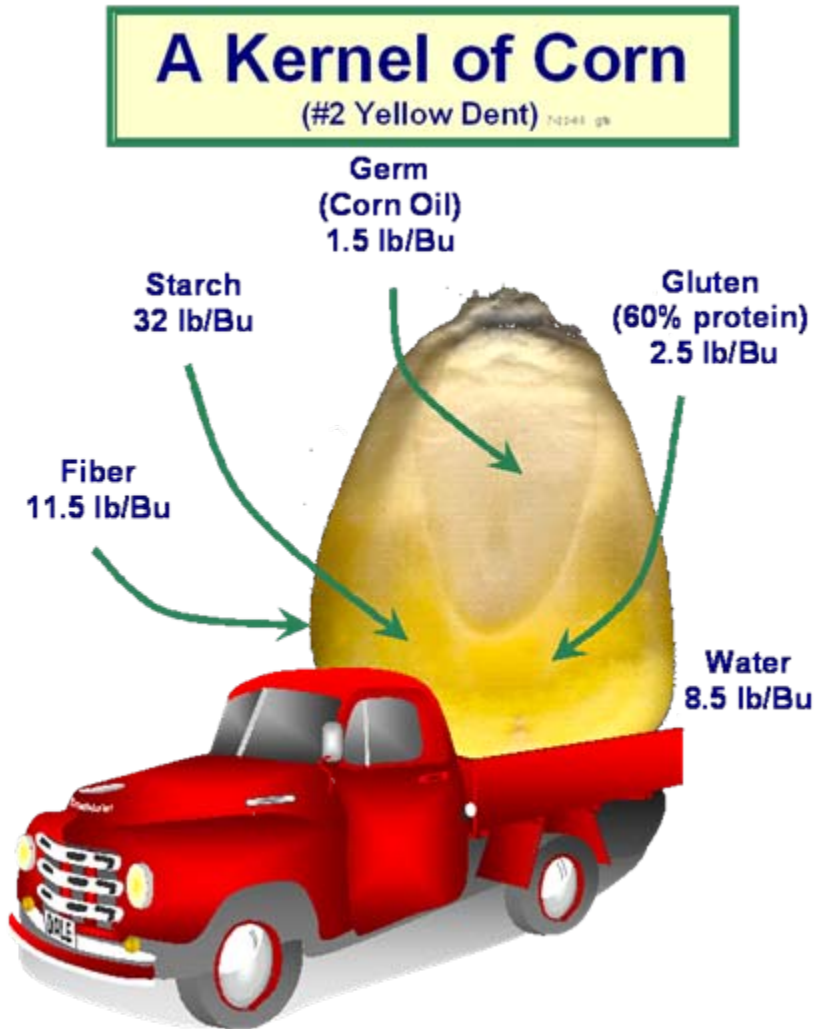
- A bushel of corn weighs 56lbs

- Aside from water (which represents approximately 15% of the total weight), there are four end products resulting from the wet milling process:

  - **Starch** which represents the largest component and is used to produce our main end products
  - Fiber also known as **Corn Gluten Feed** ("CGF")
  - Gluten (protein) also known as **Corn Gluten Meal** ("CGM")
  - Germ which is used to produce **Corn Oil**

- Corn Gluten Feed, Corn Gluten Meal and Corn Oil are collectively referred to/known as **co-products**

- Over 80% of our corn grind is used by Bulk Ingredients and so majority of any co-product effect is felt within that business

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Outputs from the corn wet milling process

- Starch is used to produce our starch-based products/ingredients

- Speciality and Bulk Ingredients product categories as follows:
  - Sweeteners
  - Food starch
  - Industrial starch
  - Ethanol

CORN

KERNELS

STEEPWATER

STARCH

Corn Gluten Meal

Corn Gluten Feed

GERM

Corn Oil

Corn Gluten Feed

SWEETENERS

FOOD STARCH

IND STARCH

ETHANOL

Starch

Corn Gluten Feed

Corn Gluten Meal

Crude Corn Oil
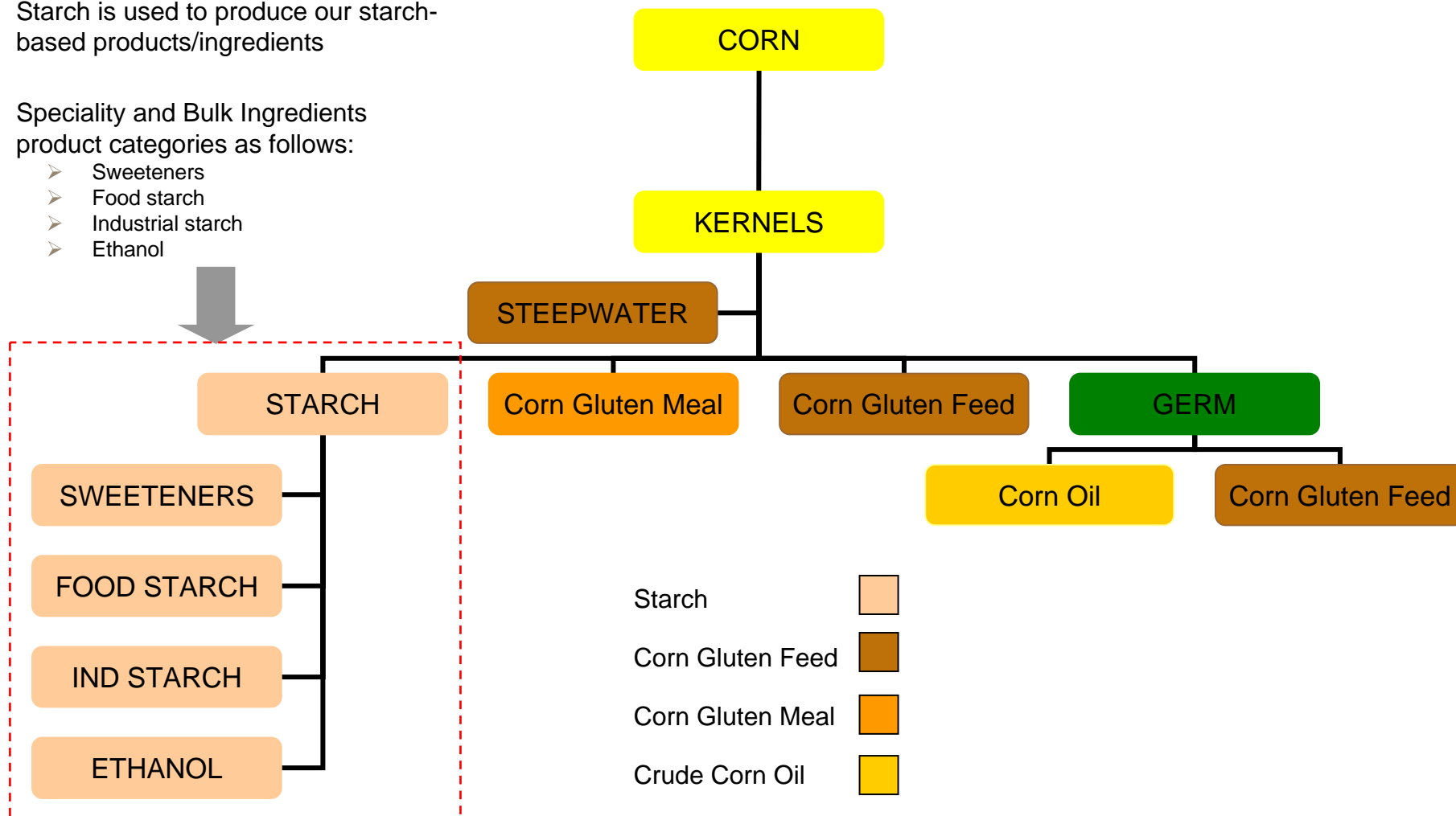
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Corn Gluten Feed ("CGF")

Largest co-product by volume and used by dairy and beef cattle markets

- CGF is a 15-20% protein co-product of the wet milling process that is used in both dairy and beef cattle markets

- Tate & Lyle volume c. 1.3m short tons per annum

- Product sold continuously throughout the year directly to customers by Tate & Lyle

- Priced in $ per short ton: c.$180* per ton vs c. $100 per ton a year ago

- Key markets and destinations:
  - Major destination is Texas
  - Also large seasonal local demand near Loudon, Tennessee plant
  - Also transported to California, Kansas, and Oklahoma markets
  - Exports to Europe

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Corn Gluten Meal ("CGM")

Highest protein content co-product used in animal nutrition

- CGM is a 60% protein higher value co-product of the wet milling process used in various animal nutrition markets

- Tate & Lyle volume is c. 250k short tons per annum

- Product is sold throughout the year by Tate & Lyle direct to customers

- Priced in $ per short ton: c. $530* per ton vs c. $480 per ton a year ago

- Destinations and markets:
  - Chile (aquaculture)
  - Asia (poultry)
  - Domestic (pet food and poultry)
  - Mexico (poultry)
  - Europe

* As at 14 September 2011 and as per WSJ prices

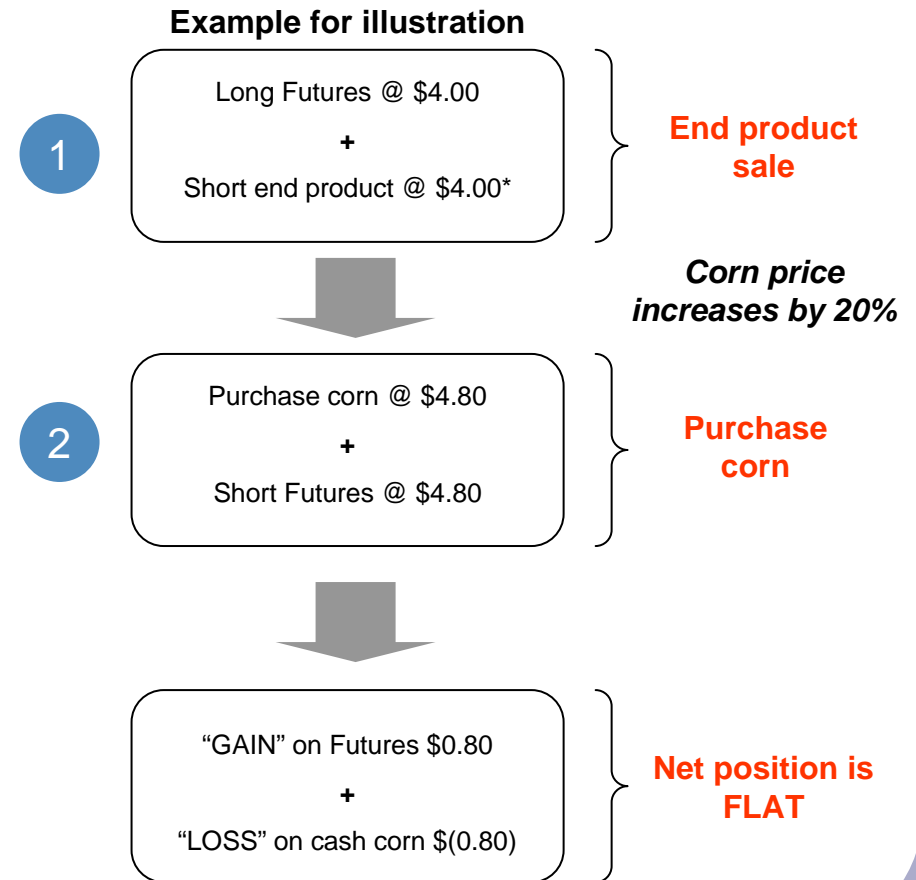**TATE & LYLE**

Corn Oil
Typically used by food producers

- Corn germ is processed to produce crude corn oil and a fiber portion (sold as Corn Gluten Feed)

- Crude corn oil is then refined and sold to customers

- Tate & Lyle volume is c. 300m lbs per annum

- Priced in cents per lb: c. 58* cents per lb vs c. 42 cents per lb a year ago

- Major markets for the end product are users of corn oil eg. Fritolay

* As at 14 September 2011 and as per WSJ prices
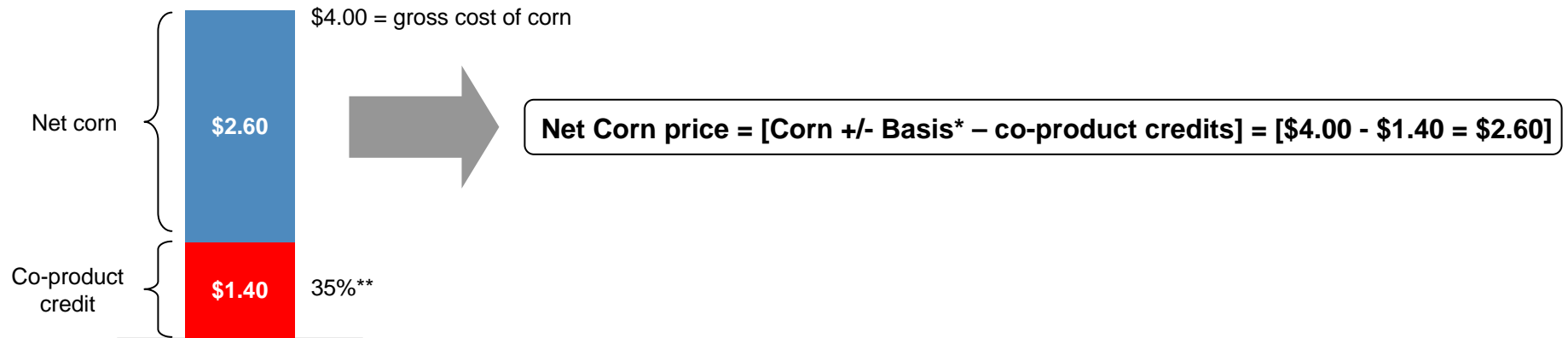
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US corn procurement and the use of hedging

- We **contract** for the sale of a significant proportion of our starch-based end products (sweeteners and industrial starches) during the October to December period for **production** and **shipment** the following calendar year

- *Step 1* - when the sweetener, industrial starch and other business units enter into a contract with a customer Tate & Lyle hedges this exposure through buying corn futures on the CME for the corresponding amount and delivery date as the end product. These 2 transactions are generally transacted on a back to back basis. **In this way, we lock in the margin over corn**

- *Step 2* - later on, usually weeks or months later, Tate & Lyle contracts for the purchase of corn from a supplier (eg. a farmer) and sells futures on the CME (unwinding the original long CME position). Any gain/loss on the future will offset any loss/gain on the physical corn purchased. In accounting for these transactions, gains and losses are built into the cost of inventory and only impact the P&L after the corn is processed and the finished good is sold

- We do not hold corn futures to take delivery – they are used as a **hedging device**

- The price we end up paying for corn will also be influenced by what is known as **"basis"** which represents a premium/discount to the CME price reflecting transport differentials and local market conditions

Example for illustration

1
Long Futures @ $4.00
+
Short end product @ $4.00*

End product sale

Corn price increases by 20%

2
Purchase corn @ $4.80
+
Short Futures @ $4.80

Purchase corn

"GAIN" on Futures $0.80
+
"LOSS" on cash corn $(0.80)

Net position is FLAT

*When we contract for the sale of a sweetener/industrial starch we are effectively "going short" in the corn market

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Relationship between co-product and end product pricing

$4.00 = gross cost of corn

Net corn — $2.60

→ **Net Corn price = [Corn +/- Basis* – co-product credits] = [$4.00 - $1.40 = $2.60]**

Co-product credit — $1.40   35%**

- The contract price we negotiate with the end product customer is a function of the **net corn cost** which is itself a function of **our prudent expectation** at the time of contracting of what we can expect to receive by way of a credit for the co-products **in the following calendar year**

- At the time of contracting we assume a **long position** in co-products. In the above example our long (purchase) price for co-products is $1.40 per bushel. The contracting process is repeated multiple times during the contracting round creating an aggregate co-product long position. Unlike corn, we are generally not able to hedge the prices of co-products. In the past, soy meal and soy oil futures contracts have provided some, albeit limited, hedging opportunity

- The long co-product position is **gradually unwound** at prices prevailing at the time the co-products are contracted which typically takes place during the following calendar year – we are subsequently "at risk" for these co-product sales until they are actually contracted. The nature of the markets in which we operate, which consists of sales to animal feed compounders, is short-term (4-6 weeks). **This can lengthen where there are concerns over supply.**
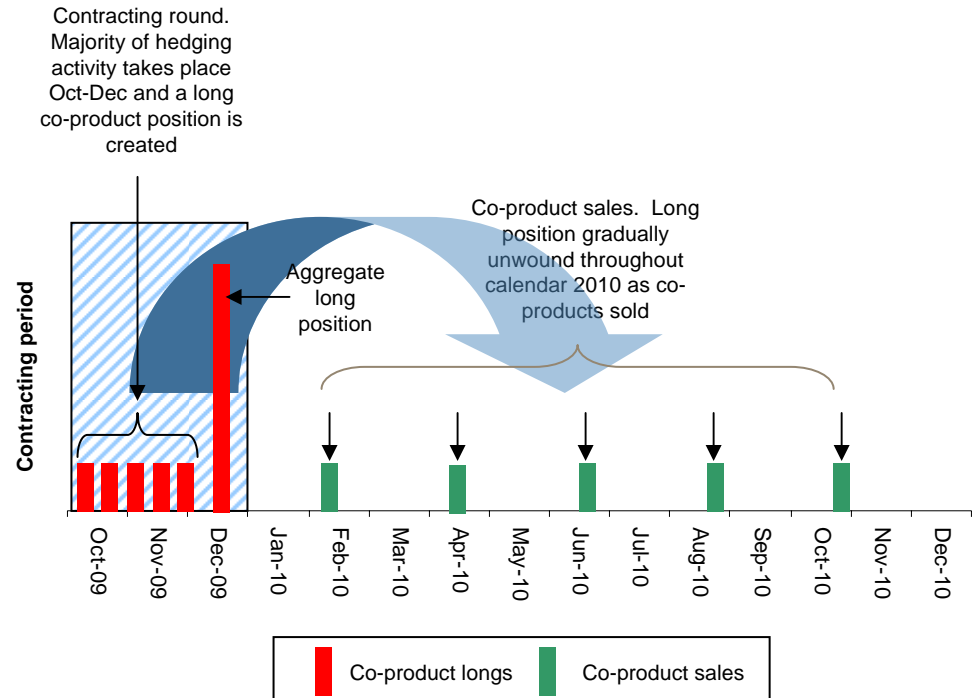
* Basis premium/discount not included in this example

** Current approximation based on recent experience. Historically this "%" has varied between 35-50%.
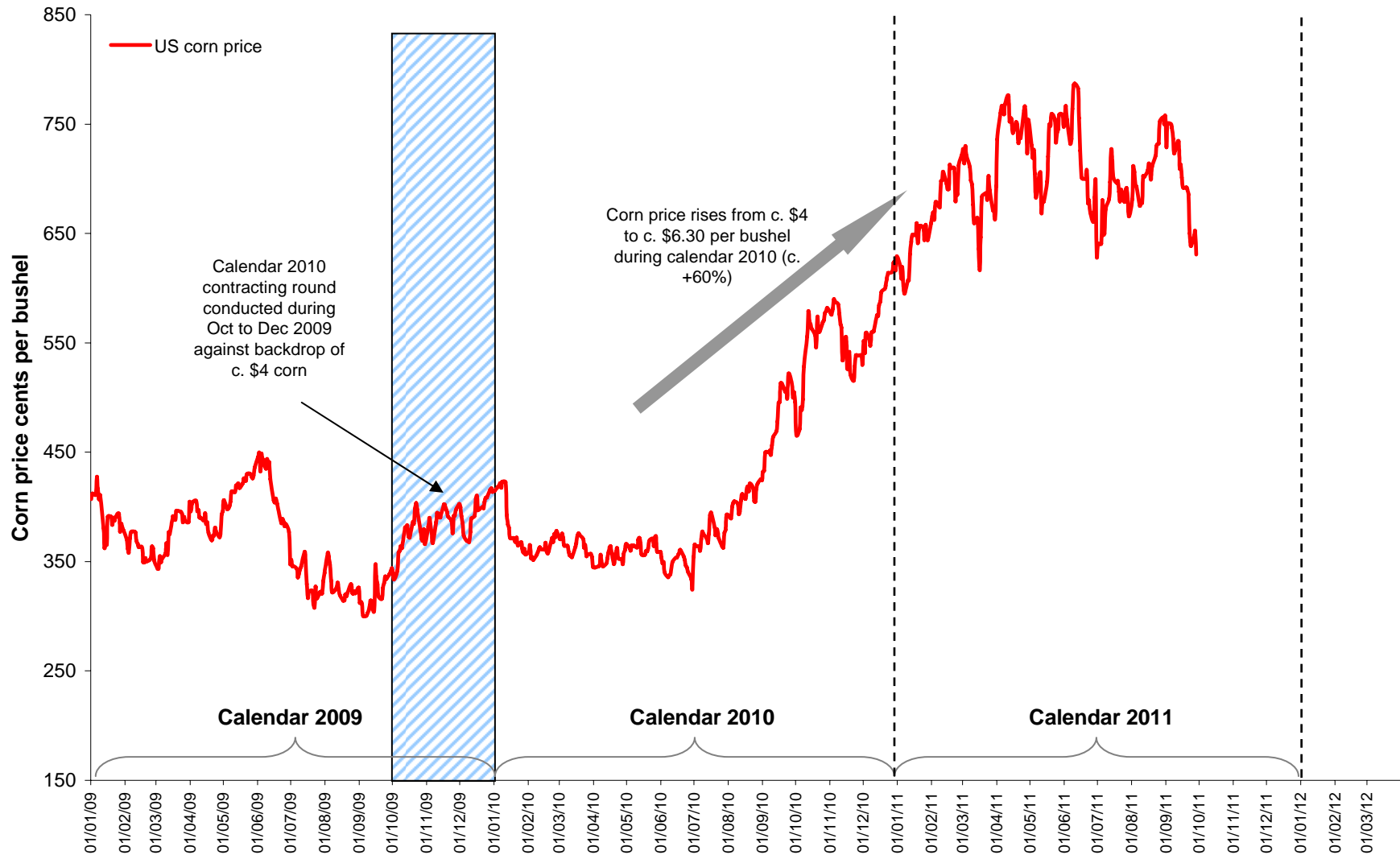
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Majority of corn hedging takes place during Oct to Dec

- Majority of hedging activity and long co-product position generated during contracting round which usually takes place during October through December

- Long position unwound gradually during following calendar year as co-products sold to respective markets

- Co-products prices will typically follow the same trends as the corn price. Corn gluten meal and corn oil has in the past demonstrated some correlation to soy meal and soy oil respectively

- Price at which we can sell co-products will be determined by prevailing demand and supply situation at the time and price of substitutes

Contracting round. Majority of hedging activity takes place Oct-Dec and a long co-product position is created

Co-product sales. Long position gradually unwound throughout calendar 2010 as co-products sold

Aggregate long position

Contracting period

Oct-09, Nov-09, Dec-09, Jan-10, Feb-10, Mar-10, Apr-10, May-10, Jun-10, Jul-10, Aug-10, Sep-10, Oct-10, Nov-10, Dec-10

Co-product longs   Co-product sales

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US corn prices have rallied over the last 2 years
Contracting round for 2010 calendar year conducted against backdrop of $4 corn

Calendar 2010 contracting round conducted during Oct to Dec 2009 against backdrop of c. $4 corn

Corn price rises from c. $4 to c. $6.30 per bushel during calendar 2010 (c. +60%)

US corn price

Corn price cents per bushel

Calendar 2009

Calendar 2010

Calendar 2011

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Intra-year corn price movements is what matters NOT absolute level of corn prices
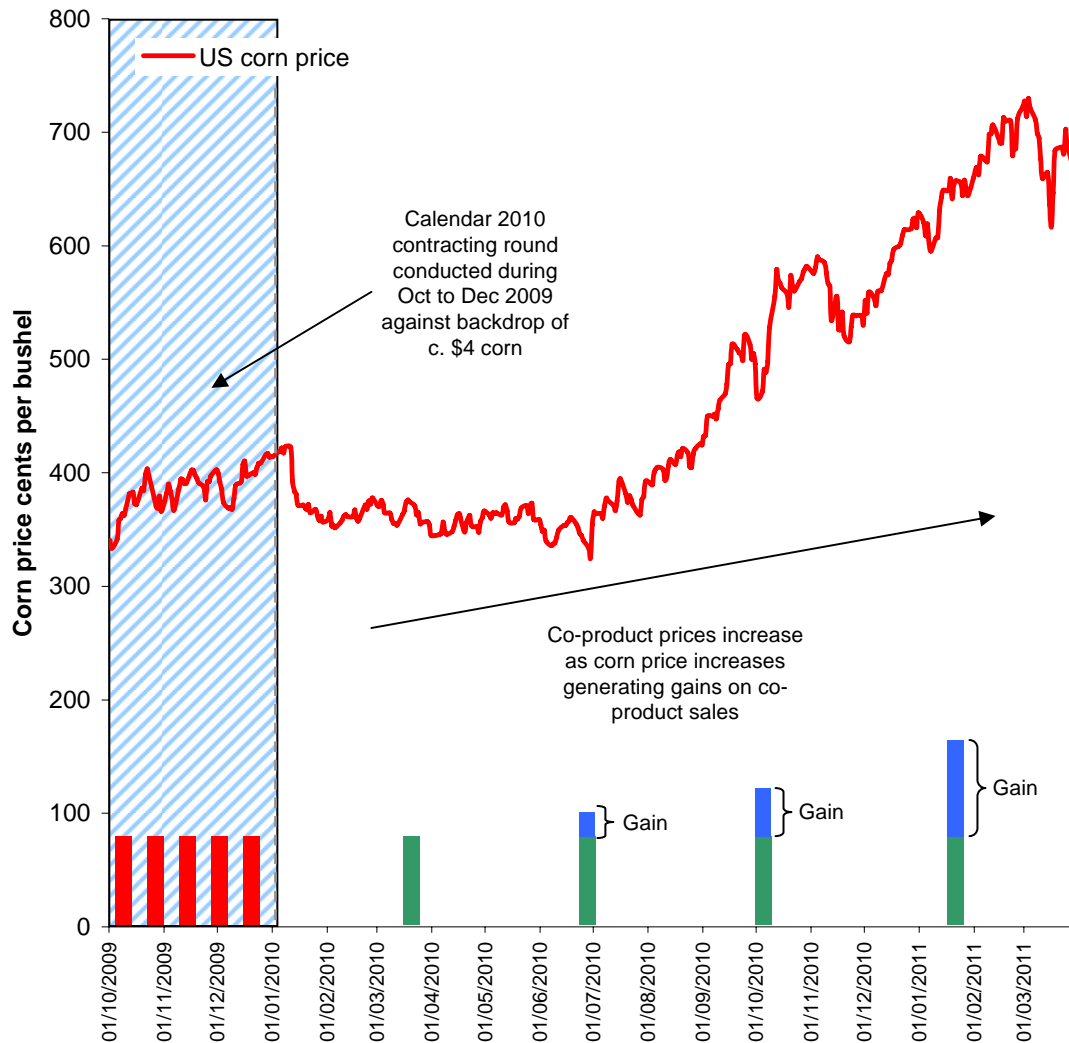
- As the corn price rallied during calendar 2010 so too did the prices at which we were able to sell co-products – **the intra-year corn price movement is what drove higher than anticipated co-product returns, not the absolute level of corn prices**

- As each batch of co-product is sold it is referenced against the reference price struck at the time of contracting during Oct to Dec

- The significant rally in corn and co-product prices during 2010 (particularly during the second half) accounted for the £16million of higher than anticipated co-product returns reported during our FY11 results

- As well as realised gains (where we have made a sale and delivered a product) we are also required to mark to market gains/losses on co-products

- We mark to market our long co-product position at the end of each month. Co-products are valued on the price contracted if pre-sold and not shipped or based on our latest view of future pricing

- Any movement in the long co-product position has to be booked directly to the P&L

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Other points to note

- **The significant movements in co-products we have experienced in recent months is a function of the significant movement in corn prices. These movements are material when compared with history**

- In tight markets, we have the ability to sell co-products forward in order to take advantage of favourable pricing conditions (as per July 2011 IMS and September 2011 trading update)

- The Wall Street Journal and Jacobsen provide a reference price for co-products

- Given the timing of the contracting round and the building up of the aggregate co-product long position during Oct to Dec, our co-product "exposure" is higher at the end of March where we still have 9 months of the calendar year left vs September when we only have 3 months to run

- Tate & Lyle is only exposed to co-product movements on fixed price contracts

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