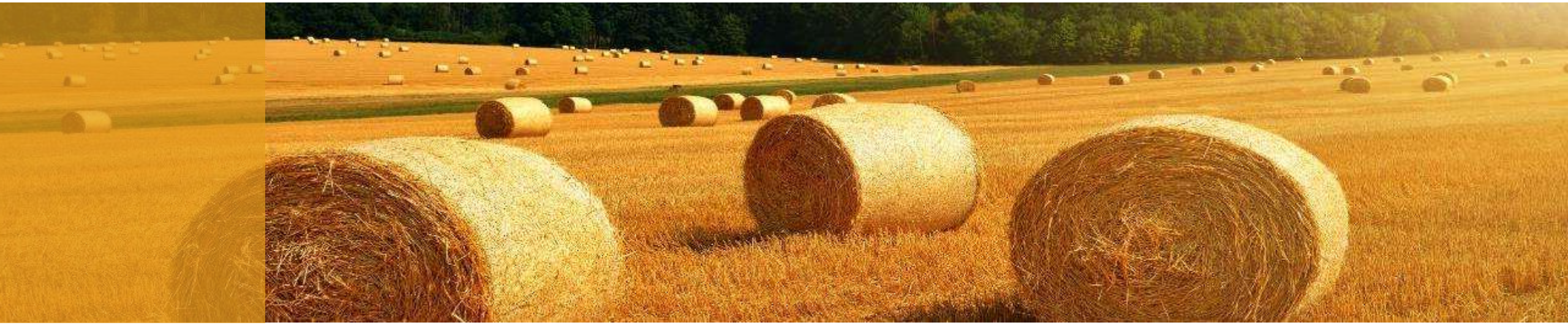
Advanced risk management:

“where theory meets practice”



Richard Cornielje - KYOS
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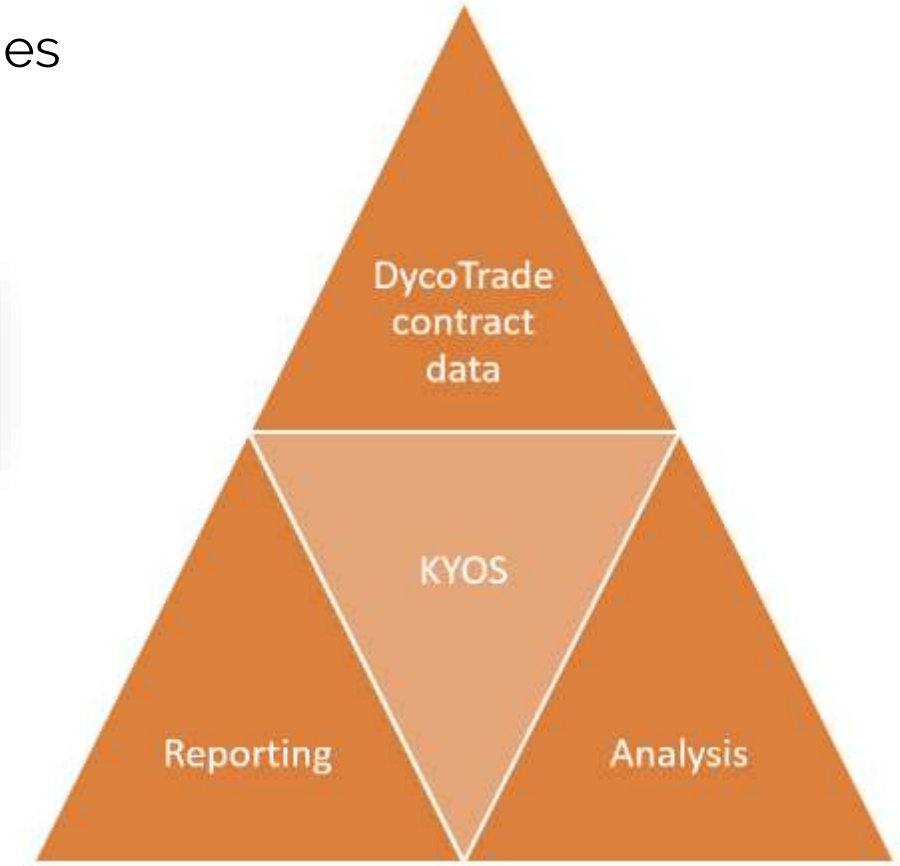
Where does KYOS adds value to the chain?

Physical flows
Financial hedges
Price analytics

Cashflow forecasts
Insight in risks
Hedge reports
Performance



CPO/CFO
Head of Trading
Head of Risk
Treasury

Enable you to look forward as …….. hindsight is a wonderfull thing

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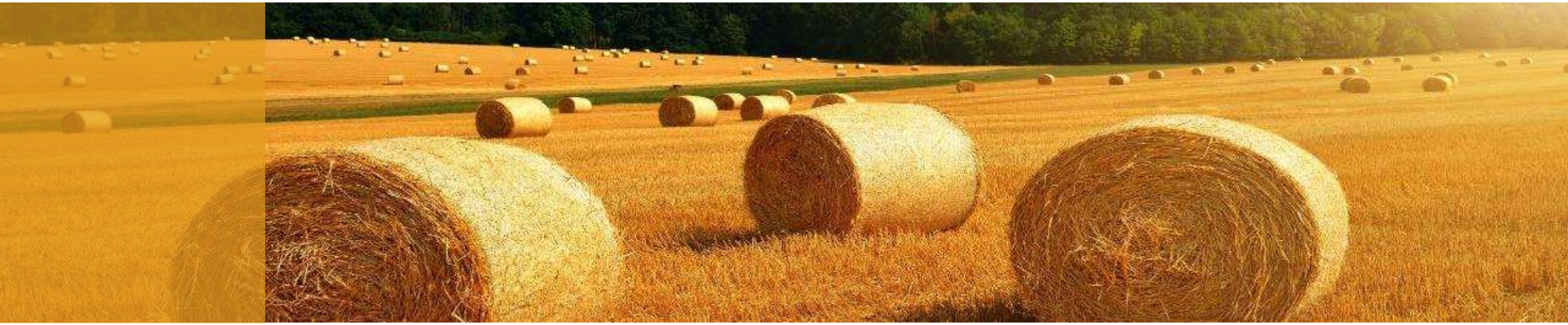
Portfolio & Risk Management in practice

- in “full” control is impossible but “be prepared”



Do not forget the past - prepare for the future

"the market has a short memory"

1996 Sumitomo (Copper)

2006 Amaranth Advisors (Natural Gas)

2015 Nidera (Biofuels)

DycoTrade & KYOS "advanced risk calculations"

- Positions
- Logistics, inventory
- Invoicing and Cashflows
- Mark-to-market
- Data source for hedge accounting ("HedgeStar")
- Stress testing (prices and volatility)
- Value-at-Risk (short term)
- Cashflow-at-Risk (long term

Valuations of structures: "accumulators"

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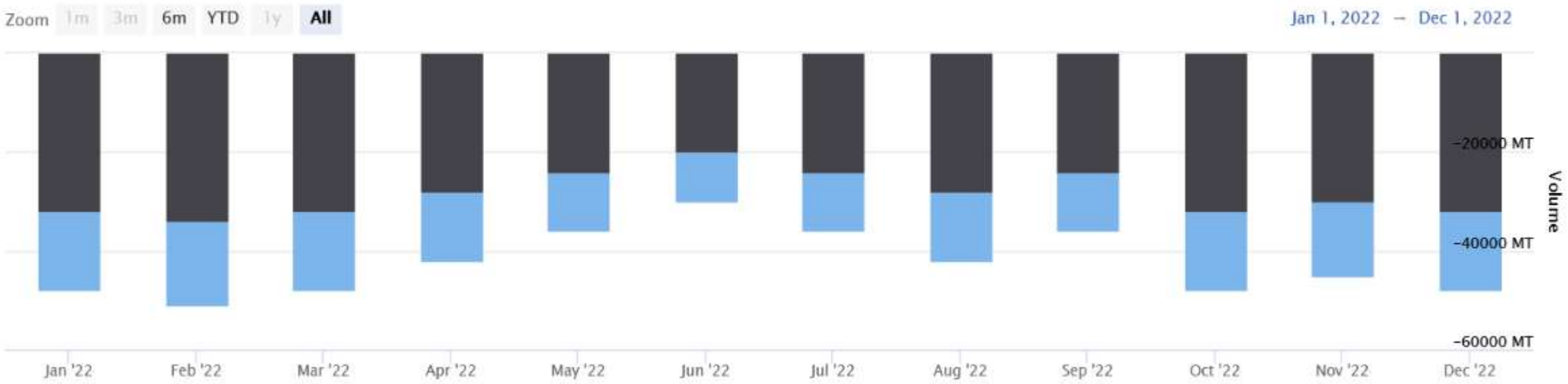
Case: production of Palm Oil



TOTAL	Latest known	MT	-510,000	-48,000	-51,000	-48,000	-42,000	-36,000	-30,000	-36,000	-42,000	-36,000	-48,000	-45,000	-48,000

Software handles consumption/production

Palm Oil: Pricing and underlying risks

- General
- Volume
- Price
- Additional costs
- Price fixing
- Administrative

Price

Pricing type: Indexed

Price = weight1 * [**commodity1** - constant1] + weight2 * [**commodity2** - constant2] + ... + fixed1 * [**FX1**] + ...

Forward indexation

Add a forward term

Spot indexation

Add a spot term

Price formula

Forward curve	Settlement price	Weight	Constant	Commodity			
				Average	Lag	Validity	
Palm oil USD (Fwd) [168]	Palm Oil in USD	1	0	1	-1	1	×

Add a formula term

Fixed terms

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Commodity pricing formula

Dextrose

- General
- Volume
- **Price**
- Additional costs
- Price fixing
- Administrative

Price formula

Forward curve	Settlement price	Weight	Constant	Commodity			
				Average	Lag	Validity	
Gluten (Fwd) [217]	Gluten	-0.1	0	1	-1	1	×
Wheat (Milling Wheat) [146]	Milling Wheat Matiff (Spot)	1.65	0	1	-1	1	×

Aluminium packaging

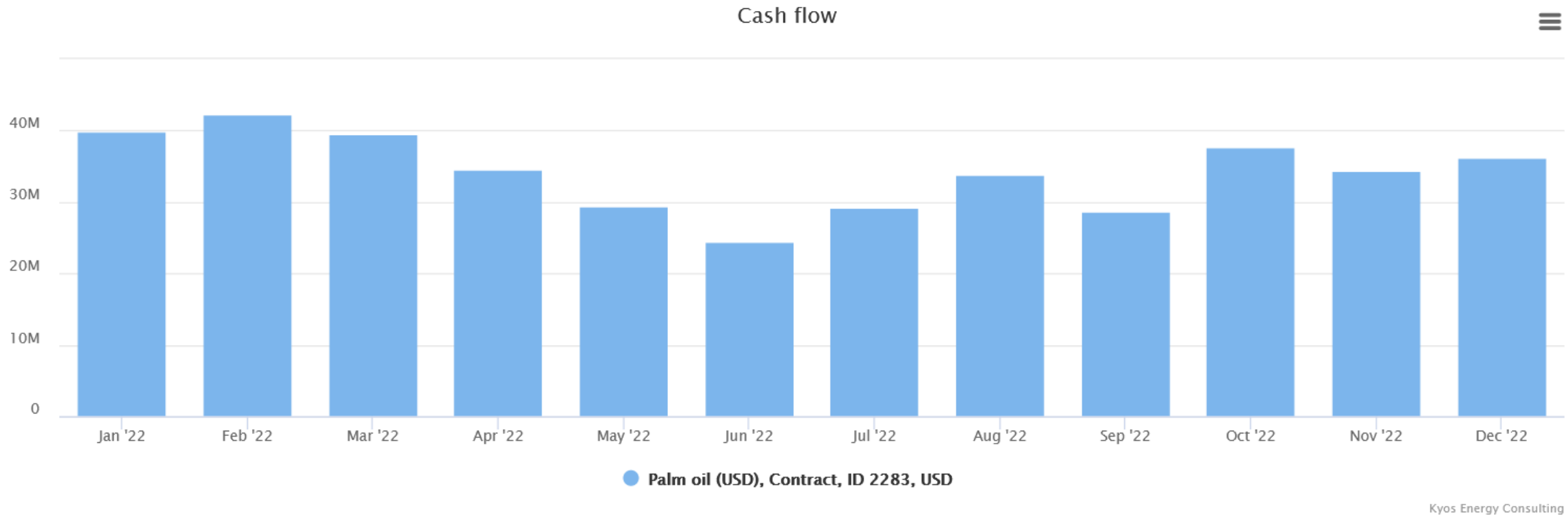
- General
- Volume
- **Price**
- Additional costs
- Price fixing
- Administrative

Price formula

Forward curve	Settlement price	Weight	Constant	Commodity			
				Average	Lag	Validity	
Aluminium LME (USD Forwarc	Aluminium USD spot	7.2	0	1	0	1	×

Add a formula term

Value based upon current market prices

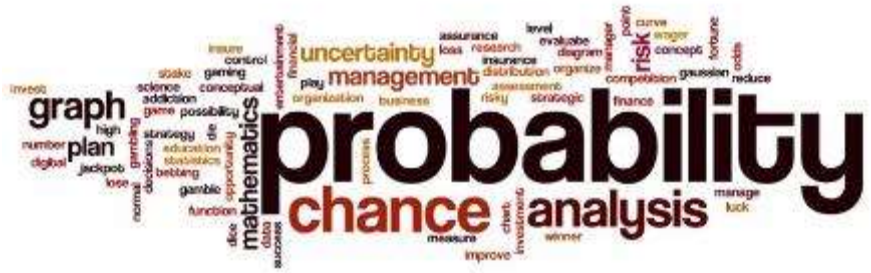


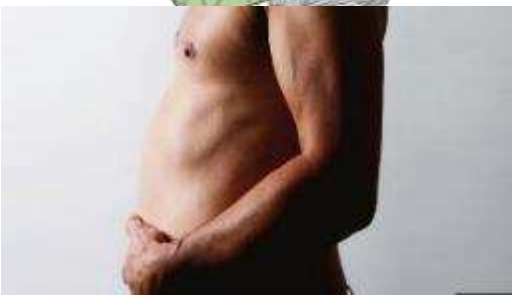
				2022												
				Tot	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Palm oil (USD)	Contract	ID 2283	USD	410,248,500	39,936,000	42,240,750	39,576,000	34,534,500	29,502,000	24,457,500	29,178,000	33,820,500	28,683,000	37,680,000	34,436,250	36,204,000
Total			USD	410,248,500	39,936,000	42,240,750	39,576,000	34,534,500	29,502,000	24,457,500	29,178,000	33,820,500	28,683,000	37,680,000	34,436,250	36,204,000

Producer can sell 510,000 MT Palm oil in 2022 for appr: 805 $/MT

Forecast - budget

CFO requests your view + forecast
for e.g. 2022 or 2023





Price movements in $/MT Palm Oil per day ?
Or even “YoY” ?

Starting point for analytics – look back

Palm Oil (cif NWE)	PRICE	Volatility			10 Years
Max (10 years)	1,187.86	Max	54.78%	Largest RISE	67.50
Min (10 years)	418.85	Min	9.99%	Largest Fall	-82.00
AVG	714.72	AVG	22.81%	AVG Change	7.64
Current $/MT	882.00	Current	35.17%	% > AVG	37.91%

KYOS analytics…..Your advantage

Combined with actual market prices

Crude Palm Oil Aug '21 (CUQ21)

832.50s +22.00 (+2.71%) 06/25/21 [CME]

CRUDE PALM OIL PRICES for Fri, Jun 25th, 2021

Find the latest Crude Palm Oil prices and Crude Palm Oil futures quotes for all active contracts below.

Intraday | Main View

Latest futures price quotes as of Mon, Jun 28th, 2021.

+ CUN21 (Jul '21)	840.25s	+23.25	N/A	840.25	840.25	817.00
+ CUQ21 (Aug '21)	832.50s	+22.00	N/A	832.50	832.50	810.50
+ CUU21 (Sep '21)	831.00s	+22.75	N/A	831.00	831.00	808.25
+ CUV21 (Oct '21)	831.25s	+23.50	N/A	831.25	831.25	807.75
+ CUX21 (Nov '21)	831.50s	+22.50	N/A	831.50	831.50	809.00
+ CUZ21 (Dec '21)	832.25s	+21.75	N/A	832.25	832.25	810.50
+ CUF22 (Jan '22)	832.00s	+21.00	N/A	832.00	832.00	811.00
+ CUG22 (Feb '22)	828.25s	+18.50	N/A	828.25	828.25	809.75
+ CUH22 (Mar '22)	824.50s	+16.75	N/A	824.50	824.50	807.75
+ CUJ22 (Apr '22)	822.25s	+17.00	N/A	822.25	822.25	805.25
+ CUK22 (May '22)	819.50s	+18.00	N/A	819.50	819.50	801.50
+ CUM22 (Jun '22)	815.25s	+18.25	N/A	815.25	815.25	797.00
+ CUN22 (Jul '22)	810.50s	+19.00	N/A	810.50	810.50	791.50
+ CUQ22 (Aug '22)	805.25s	+20.00	N/A	805.25	805.25	785.25

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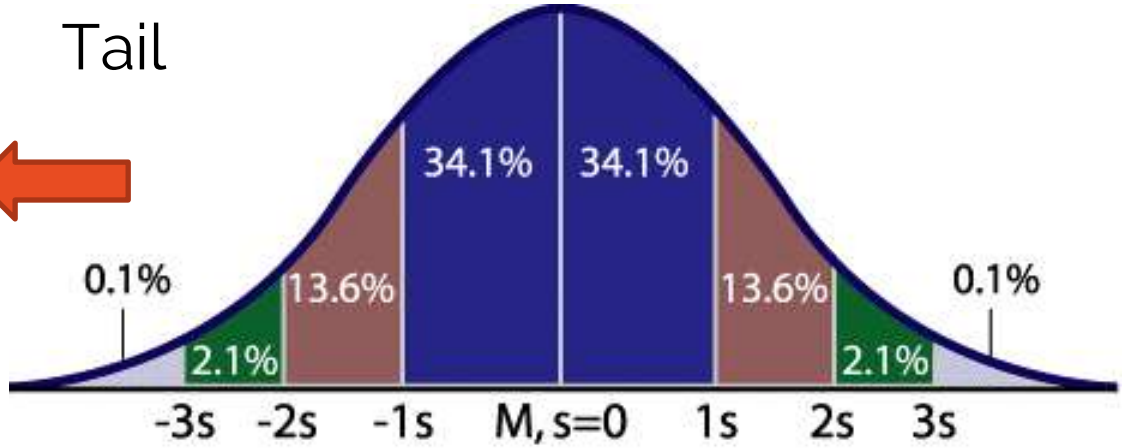
Now we can start to “look forward”

What can happen from today to tomorrow

Tail

Tail



68.2% = 1* standard deviation

95.4% = 2* standard deviation

Estimating or calculating risks

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Monte Carlo (MC) Simulations

- Long horizons (e.g. budgets for 2022-2023)
- Tails – non “normal distribution”
- Exposure is complex
  - multiple commodities
  - structured options like accumulators
- Volumes might be uncertain and need to be simulated too
- Dynamic trading strategies

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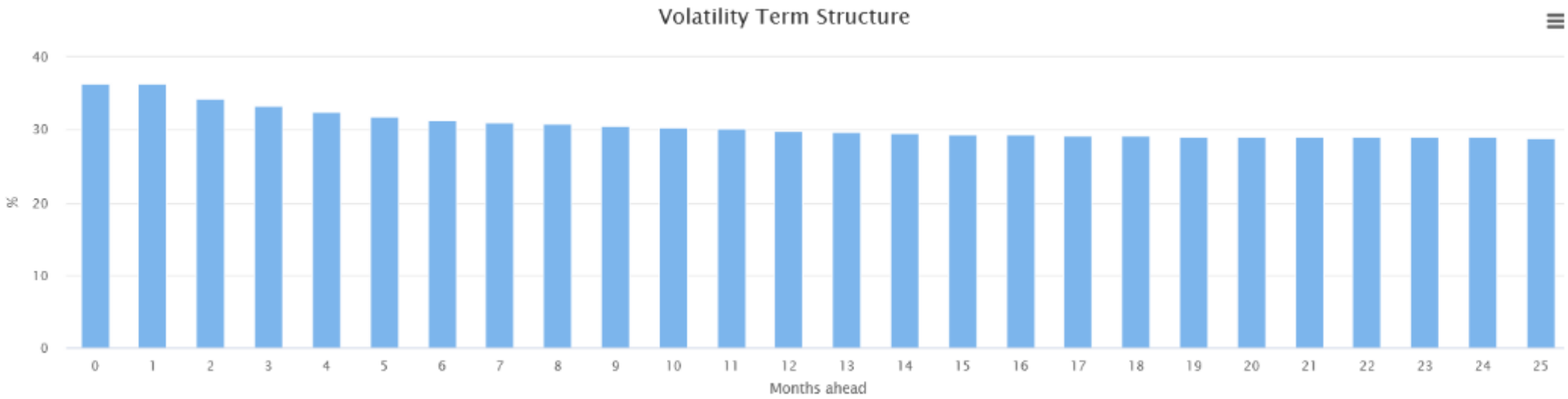
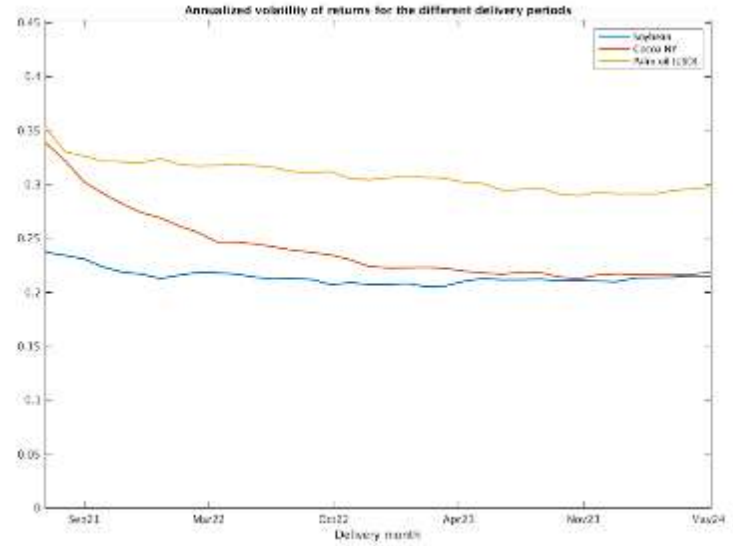
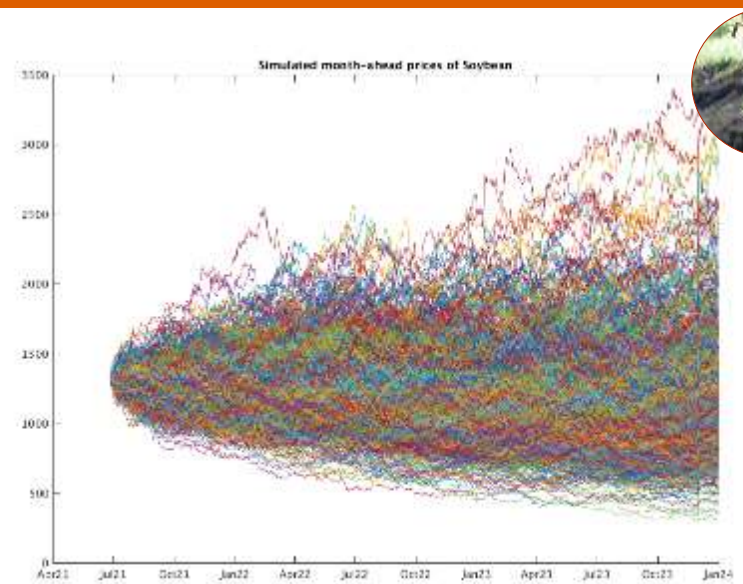
MC Simulations for Palm Oil prices

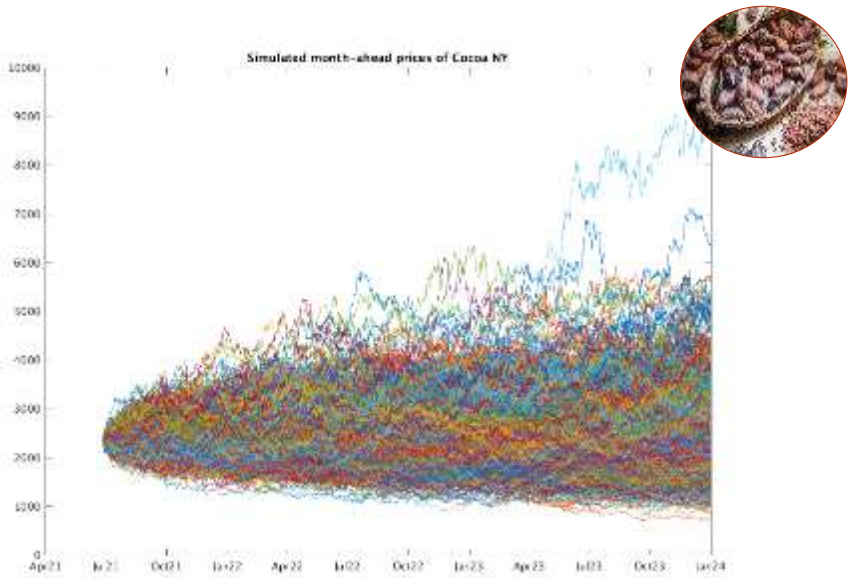


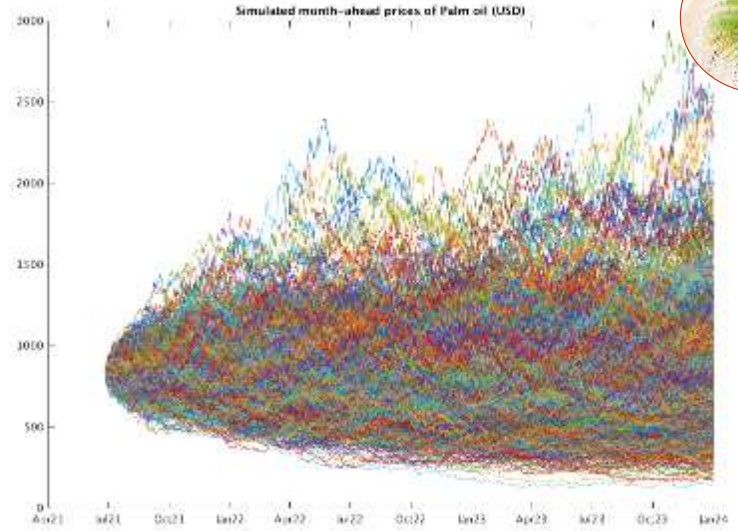
Correlations are calculated & visualized as well

Simulations for multiple commodities









Short term risk statistics

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Env: kyos-cca (Production) on cca.kyos.com |

Settings | Price data | Time series | Curves | Assets & Contracts | Risk analytics | Analytics | Custom analytics | Logs

Monthly risk | Daily risk | Hourly risk | Hedge reports | Stress tests | Value-at-Risk | Profit-at-Risk | Custom reports

Edit KyVaR profile

Name	Producer Palm Oil
Model base currency	USD
Contract filter	VaR Palm Oil Sales 2022 [1084]
KySwing filter	(None)
KyOption filter	(None)
KyAccumulator filter	(None)
Reporting period	Jan - Dec — The VaR is broken down in an annual VaR calculated over the mentioned period
Confidence level	95 %
Risk horizon	1 trading days
Run with simulation	Yes / No
KySim profile	Palm Oil Trading [195]
VaR limit	10000000 — empty or integer greater than 0

Sales of 510,000MT during 2022

What can happen in 1 single day

with a 95% confidence level

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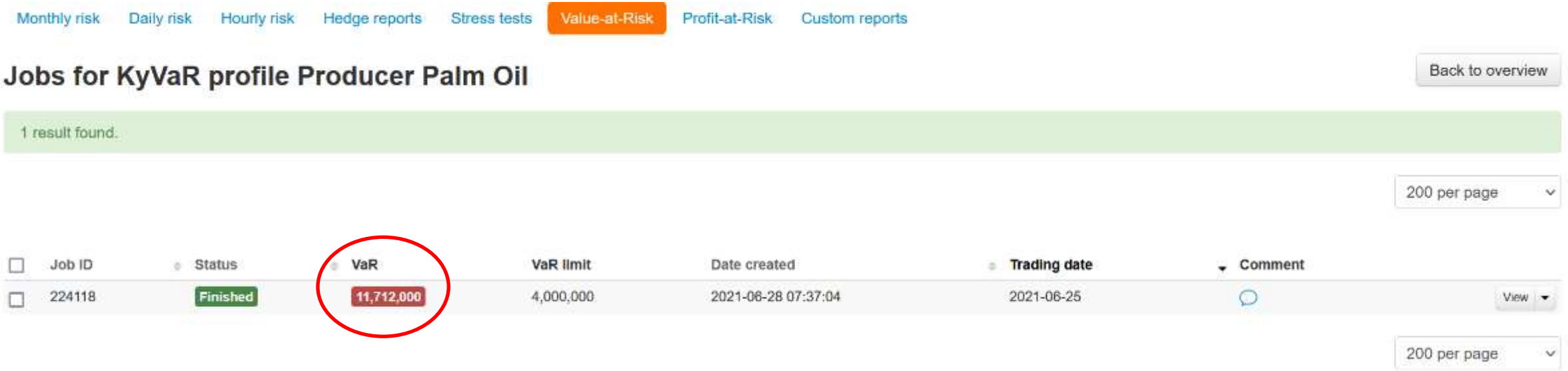
How to use statistics in real life



What can happen in 1,5 or 10 days with a 95% or 99% confidence level:

- MtM
- Cashflow

With a 95% confidence level sales value will not change with more than $ 11.7 million in 1 day.....watch out.....it is not the maximum

Long term risks : CFO - shareholders

Cashflow-at-Risk (CfaR):

CFO question: What can happen with our cashflow during 2022 if we do not hedge this position ? How sure are we?

In practise many clients hedge (part of the) exposures

- Fully or partially hedged
- Physical and/or financial hedges

Cashflow-at-Risk should be part of the process to determin your hedging strategy

Unhedged position “bull riding”

Risk Profile: Palm oil producer 2021-06-25

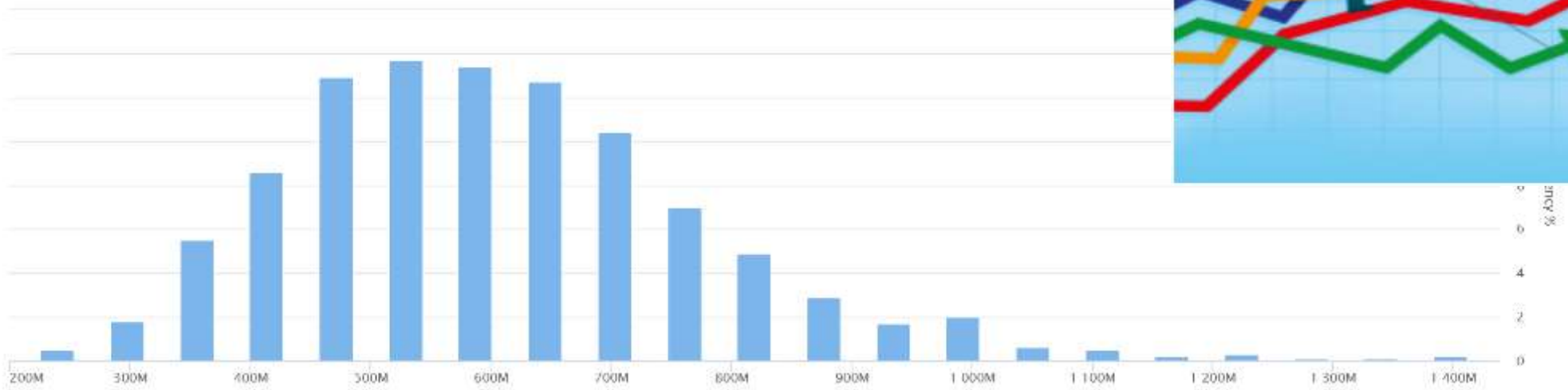
Export to Excel | Back to results

Earnings at Risk | Cash-flow at Risk | Volumes at Risk

Cash-flow at Risk Summary	Currency	95% at Risk
Commodity: Total	USD	162,945,647

Commodity: Total

Histogram graph



Commodity	Currency	Avg	1%	5%	10%	90%	95%	99%
Total	USD	410,496,875	204,208,233	247,551,228	273,809,172	558,135,217	622,886,040	757,851,377

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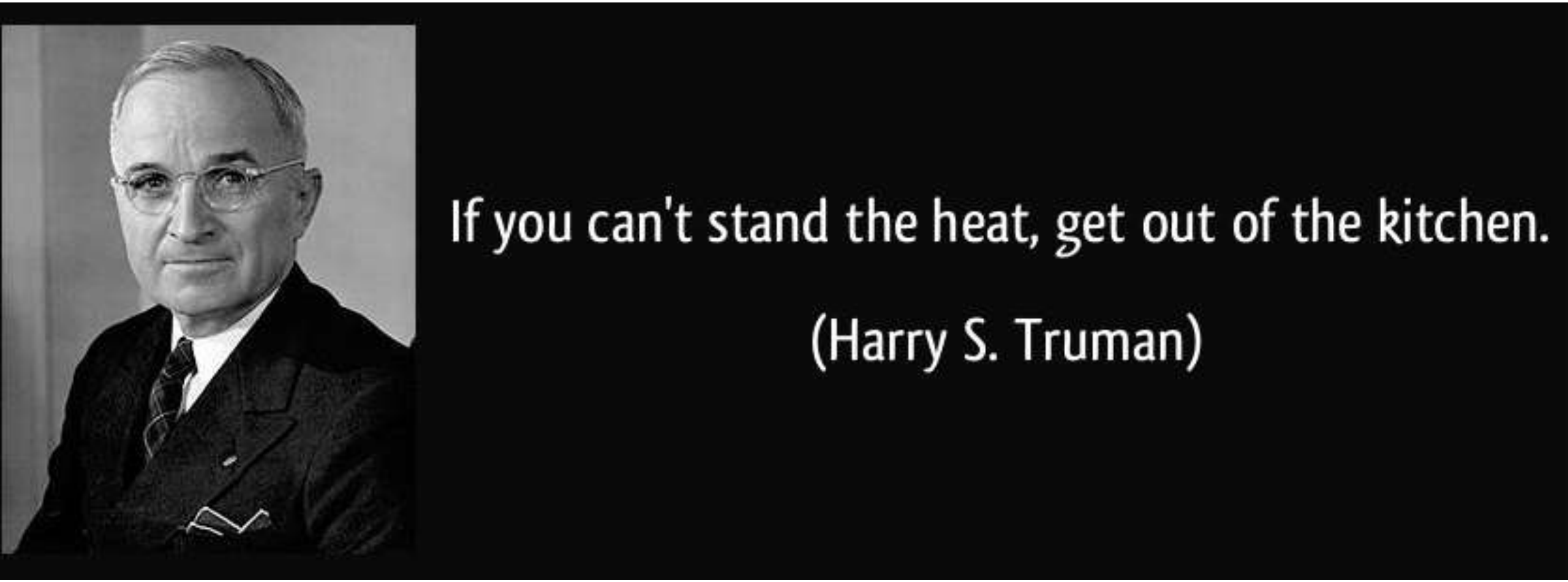
Risks – but what is risk ?

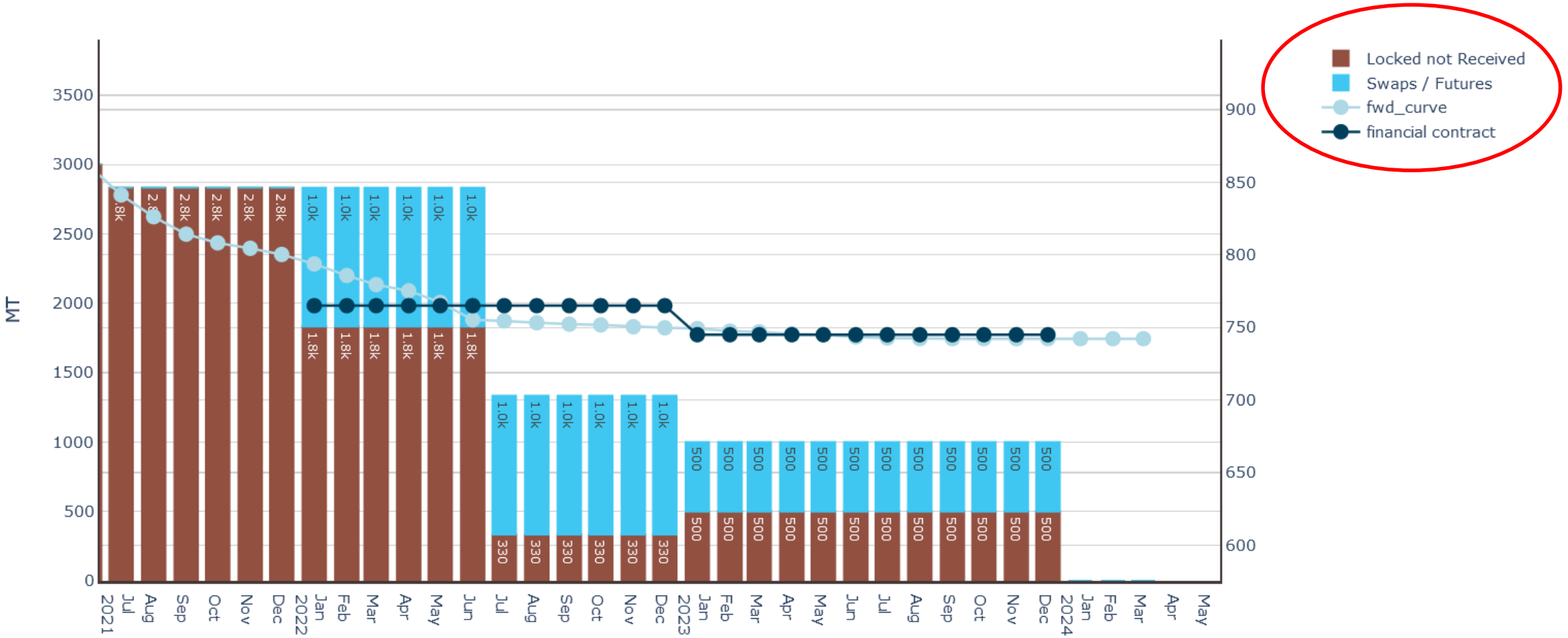


Hedge portfolio

- Physical hedges
- Financial hedges
  - Swaps/futures
  - Plain vanilla options
    - Calls/puts
  - Structured products
    - Accumulators

Coverage reporting

Physical and Financial hedges combined incl hedge & market prices



Performance versus budget & strategy

Example: Producer of Palm Oil

	Cover					Price ($)				Performance($M)		
2022	Q1	Q2	Q3	Q4	FY	Covered	Open	Blended	AOP	Covered	Uncovered at Market	Total vs AOP
Producer Palm Oil	24%	32%	24%	19%	24%	814.8	803.5	806.2	825	-1.3	-8.3	-9.6
Total										-1.3	-8.3	-9.6

with analytics…..you are better prepared

Risk Profile: Palm oil producer (partially hedged) 2021-06-25

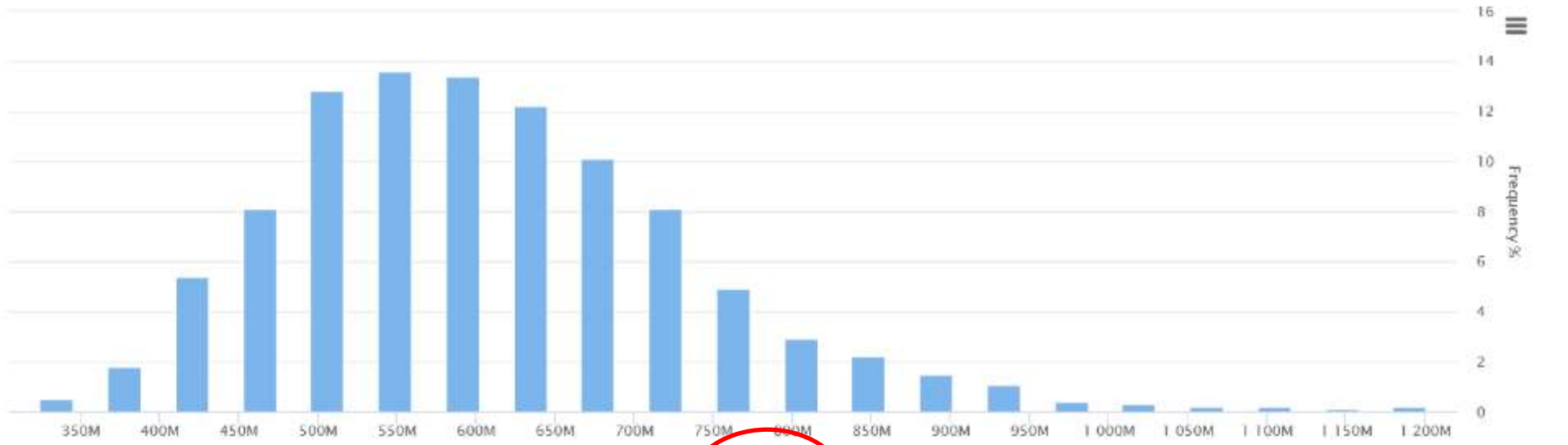
Export to Excel | Back to results

Earnings at Risk | Cash-flow at Risk | Volumes at Risk

Cash-flow at Risk Summary	Currency	95% at Risk
Commodity Total	USD	123,222,730

Commodity: Total

Histogram graph



Commodity	Currency	Avg	1%	5%	10%	90%	95%	99%
Total	USD	411,170,025	255,263,201	287,947,295	307,867,273	522,632,503	571,264,908	662,384,344

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Realized business values

- Up-to-date insight in risks and potential cashflows
- Consistency & transparancy across commodities
- Uncertainty translated into EUR
- Supporting decisions
- You are prepared