

Weather Risk Management

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- T** ● **Index Based Weather Covers**
- A** ● **Energy**
- B** ● **Index Based Reinsurance**
- L** ● **Humanitarian Aid**
- E** ● **Market Figures**

Concept of index based weather covers: Definitions

- Traditional insurance :
 - Material damage and loss of profit following an exceptional event such as storm, typhoon, flood...
 - Covered by “usual insurance” products with an indemnification of incurred and adjusted losses
- Index based cover :
 - Risk exposure is based on the strong correlation between company’s sales/income/expenses and daily meteorological variations.
 - Payout is agreed and triggered only by a weather index, assuming the index is a good proxy to the exposure.

Concept of index based weather covers: Multiple choice of indices

- **Underlying:**

- Temperature
- Precipitation : rainfall, snowfall
- Others : wind speed, relative humidity...
- Combinations

- **Index:**

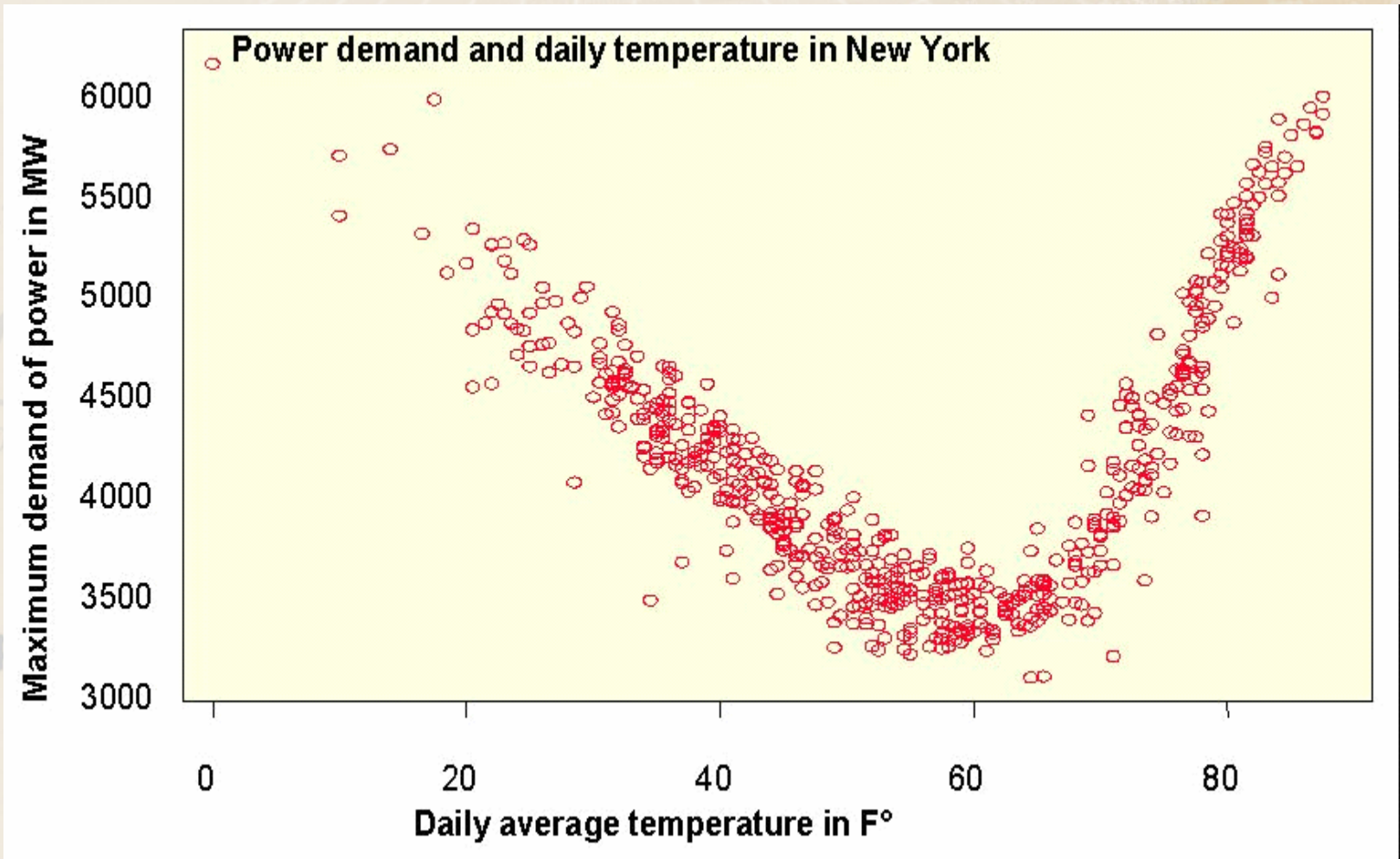
- Critical day
- Mean (weighted or not)
- Cumulative (with threshold or not)
- Combinations

Concept of index based weather covers: Key elements of the product

- **A cover is defined by:**
 - A period (November to March)
 - An index (cumulated rainfall, HDD, Mean Temp...)
 - A weather station (Paris Orly)
 - A payment structure (Put, Call, Swap, etc)
 - A legal agreement (insurance or derivative)

- **The hedge is tailor made:**
 - Index is best proxy to the correlation between the risk exposure and the weather conditions

Energy sector example: Heating demand fluctuates in winter (1/2)



Energy sector example: Heating demand fluctuates in winter (2/2)

- **Weather risk exposures :**

- Sales decrease when winter is too mild (heating demand)
- Profitability decreases when winter is too cold (costs)

- **Solution :**

- HDD Put against mild winter and a decrease in sales
- HDD or CTD Call, against a too cold winter and increase in costs

HDD, Heating Degree Day : Number of degrees below 18°C

CTD, Critical Temperature Day : Number of days where temperature < 0°C

Energy sector example: Wind farm financing secured by wind guarantee

- **Weather risk exposure :**

- Sales are secured and prices are regulated
- Wind speed is the key factor: power generation is linked to wind speed through the power curve

- **Solution :**

- Index: WPI: Wind Power Index
- Put : protection against lack of wind ie drop in power generation
- Financial leverage to decrease the cost of capital
- Guaranteed minimum income is a security for creditors

Insurance or energy example: Marketing Smoothing your Heating/Air conditioning bill

- **Weather risk exposures :**

- When summer is too hot (or the winter is too cold) end user electricity bill increase (Air conditioning/Heating demand)

- **Solution :**

- Monthly or seasonal digital protection against a high average daily maximum temperature. (ex \$100 if Av. TMax > 30°C)
- Client pay off: credit on the next bill
- Guarantee paid by the client or free and provided by the distributor
- Development of customer loyalty and marketing differentiation

Index Based Reinsurance: Wind trigger and intensity of damages

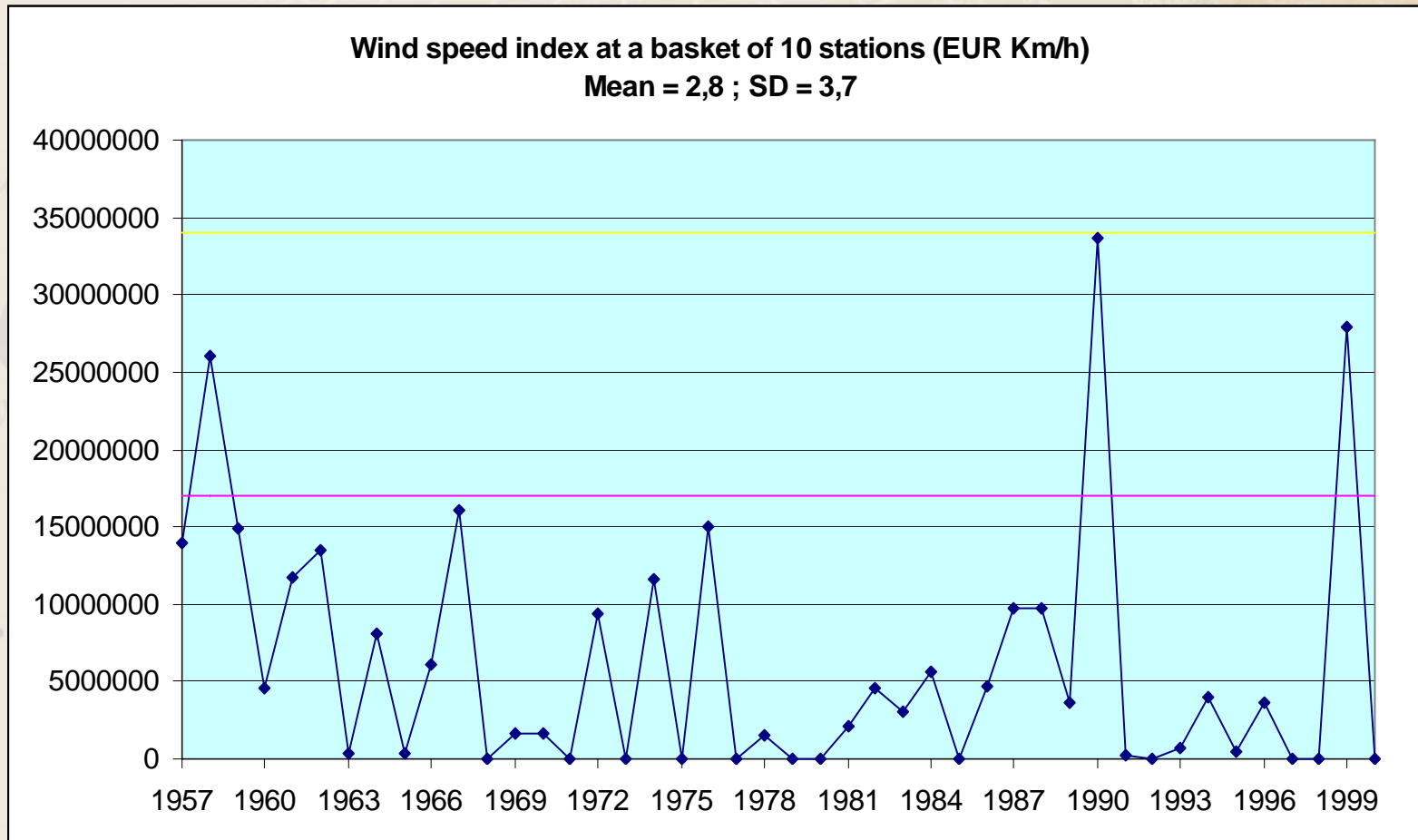
- **Weather risk exposure:**

- Property and motor physical damages due to strong storms are strongly correlated to the wind speed

- **Solution:**

- Annual aggregate excess of loss property treaty
- 10 weather stations spread all over France
- Each station has a specific weight
- Each station has a specific wind speed threshold high enough to capture only strong storms (e.g. 120 Km/h)
- Each station has a specific wind speed limit high enough from the threshold (e.g. 160 km/h) as to capture storms severity

Index Based Reinsurance example: Wind trigger and intensity of damages



Index Based Reinsurance example: Wind trigger and frequency of damages

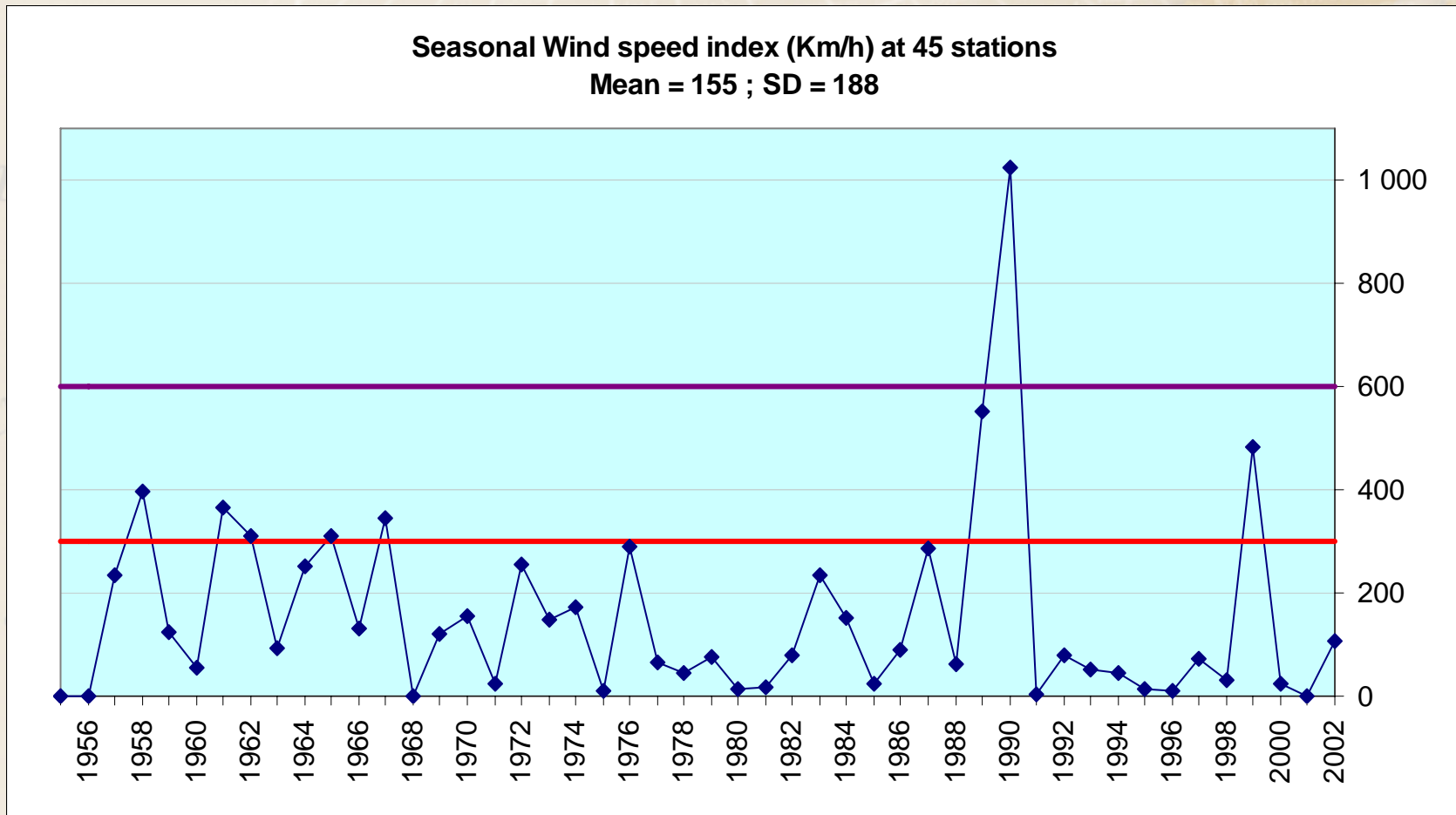
- **Weather risk exposure:**

- Property and motor physical damages due to strong storms are strongly correlated to the wind speed

- **Solution:**

- January-December SL treaty
- 45 weather stations spread over 5 European countries
- Each station has a specific weight
- Each station has a specific wind speed threshold high enough to capture storms (e.g. 110 Km/h)
- Each station has a specific wind speed limit close to the threshold (e.g. 115 km/h) as to capture storms frequency only

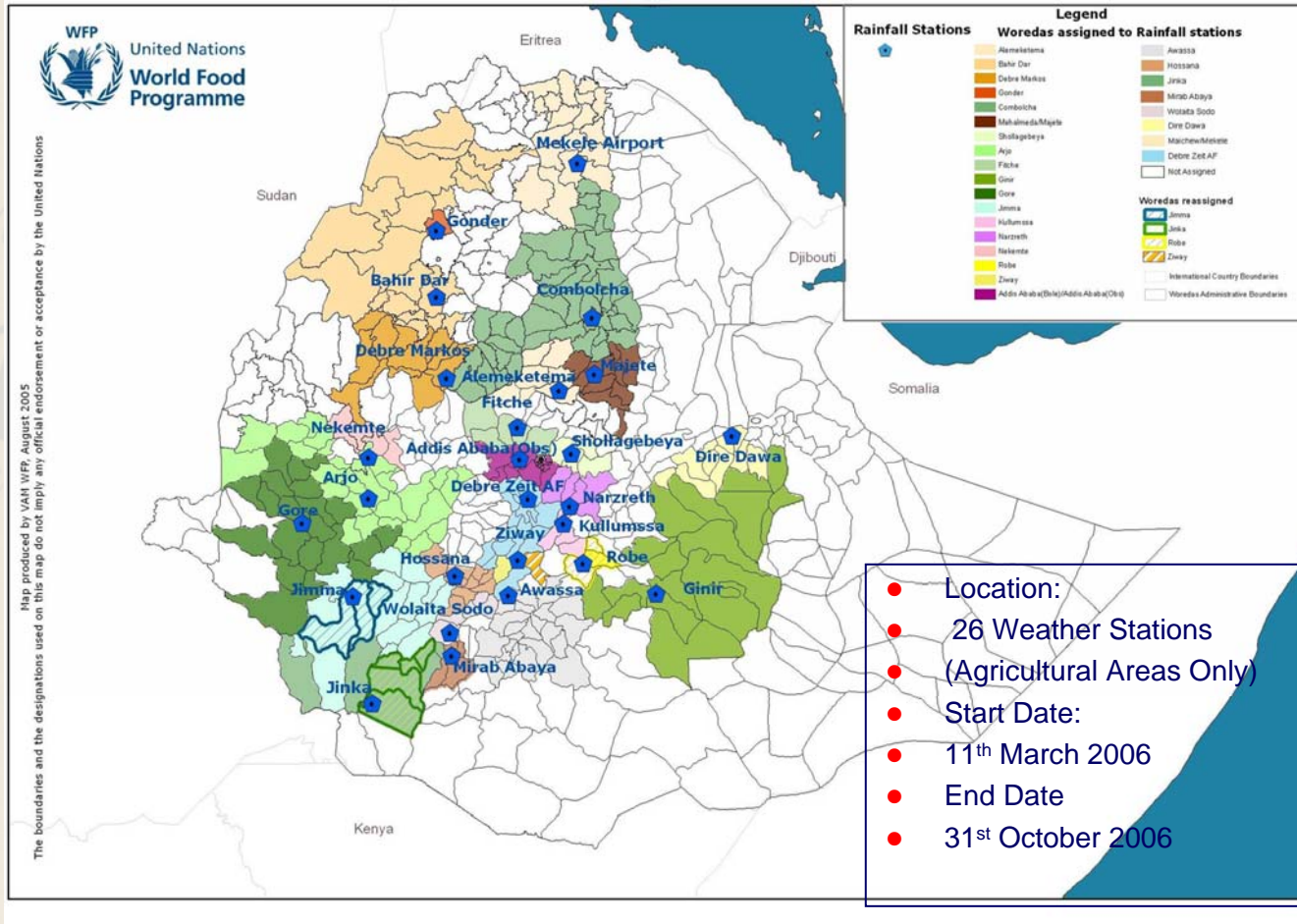
Index Based Reinsurance example: Wind trigger and frequency of damages



Humanitarian Aid: Ethiopian Structure

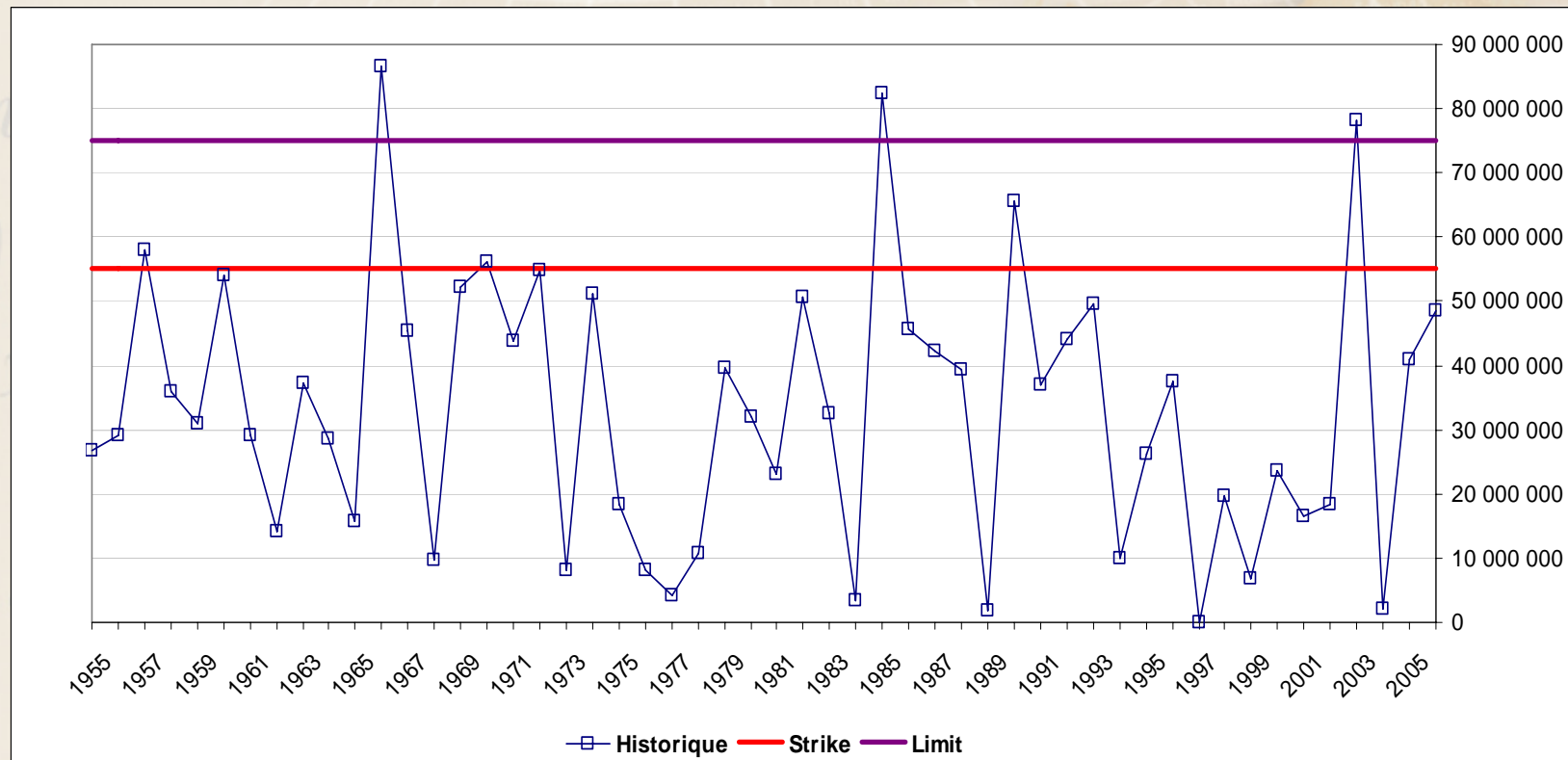
- Target : to establish contingency funding for an effective aid response for the WFP
- Rapid availability of funds: More efficient Aid
- Vehicle : based on FAO's crop water balance model and 26 primary weather stations with daily data
- Structure defined by crop and by weather station.

Humanitarian Aid: Ethiopian Structure



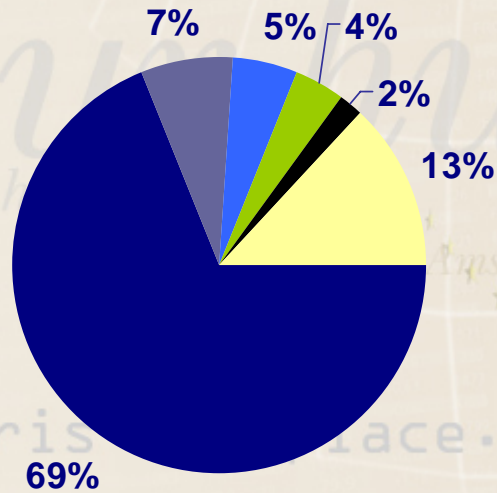
Humanitarian Aid: Ethiopian Structure

Ethiopia drought Index value

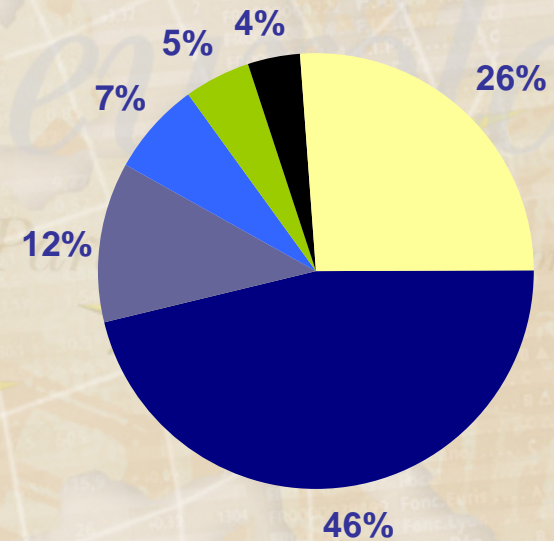


Market figures: Distribution of Inquiries, by Sector of Potential End-User (OTC)

2005 Survey

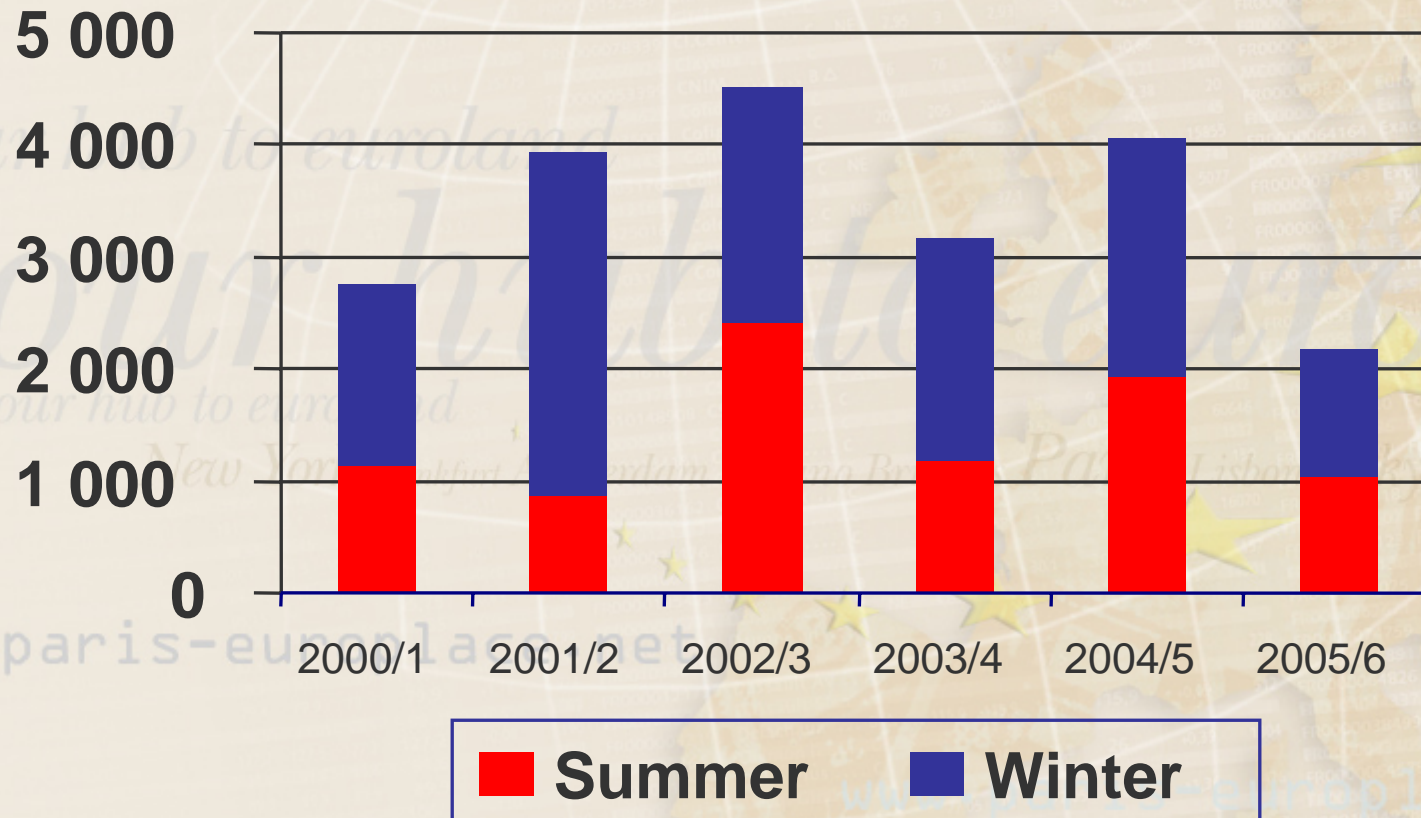


2006 Survey

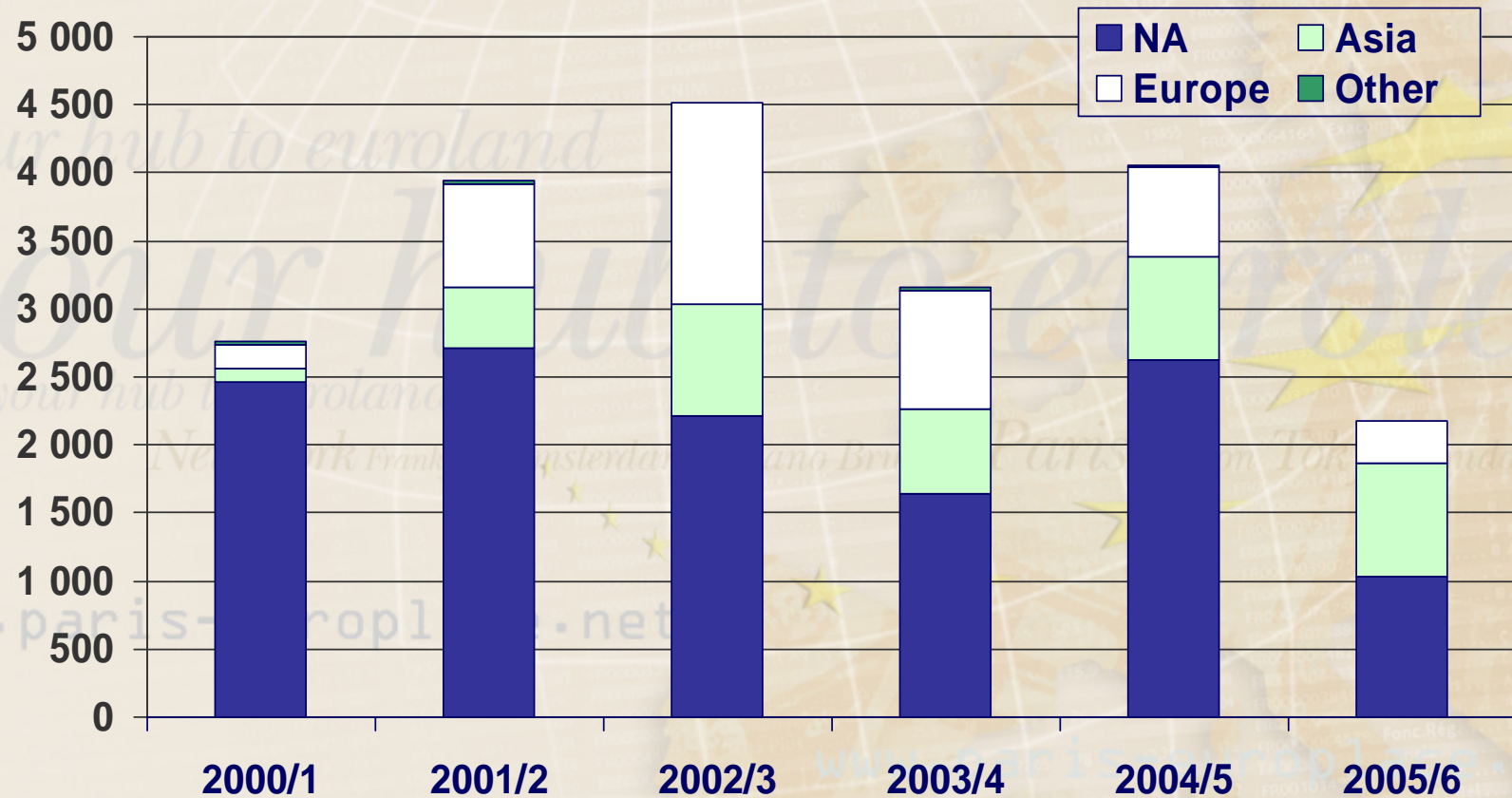


- Energy
- Agriculture
- Retail
- Construction
- Transportation
- Other

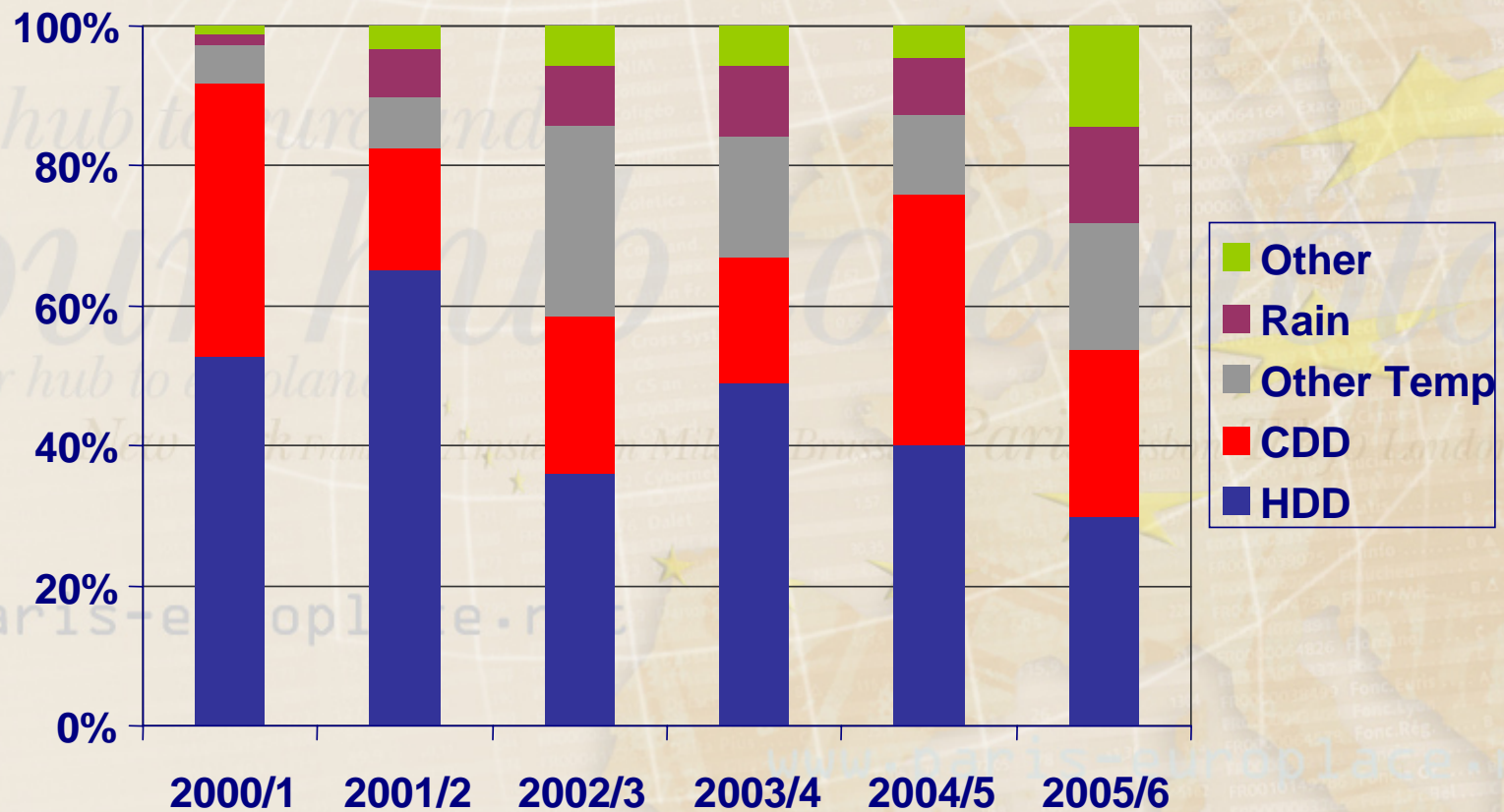
Market figures: Number of Contracts (OTC)



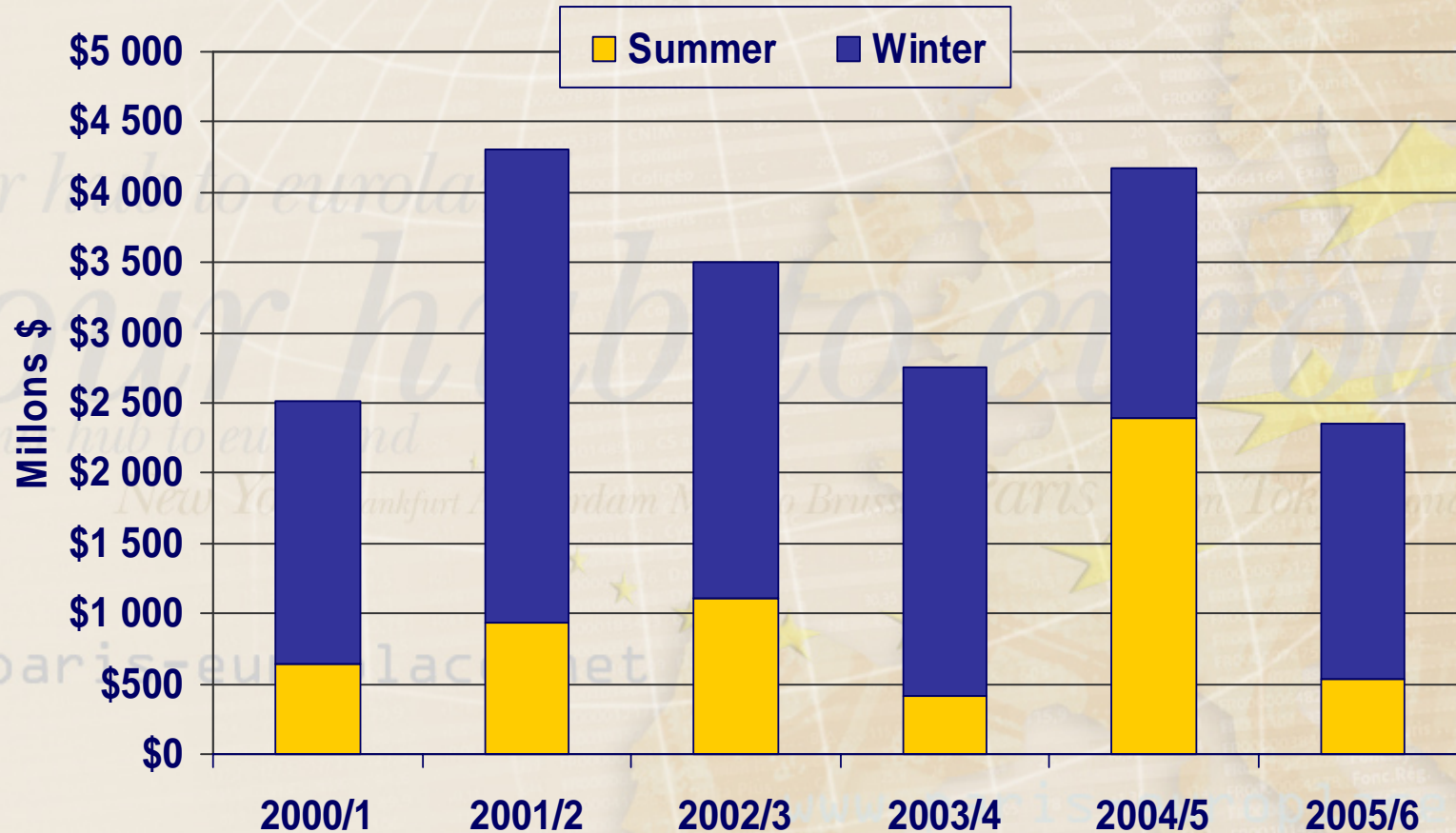
Market figures: Distribution of Total Number of Contracts by Region (OTC)



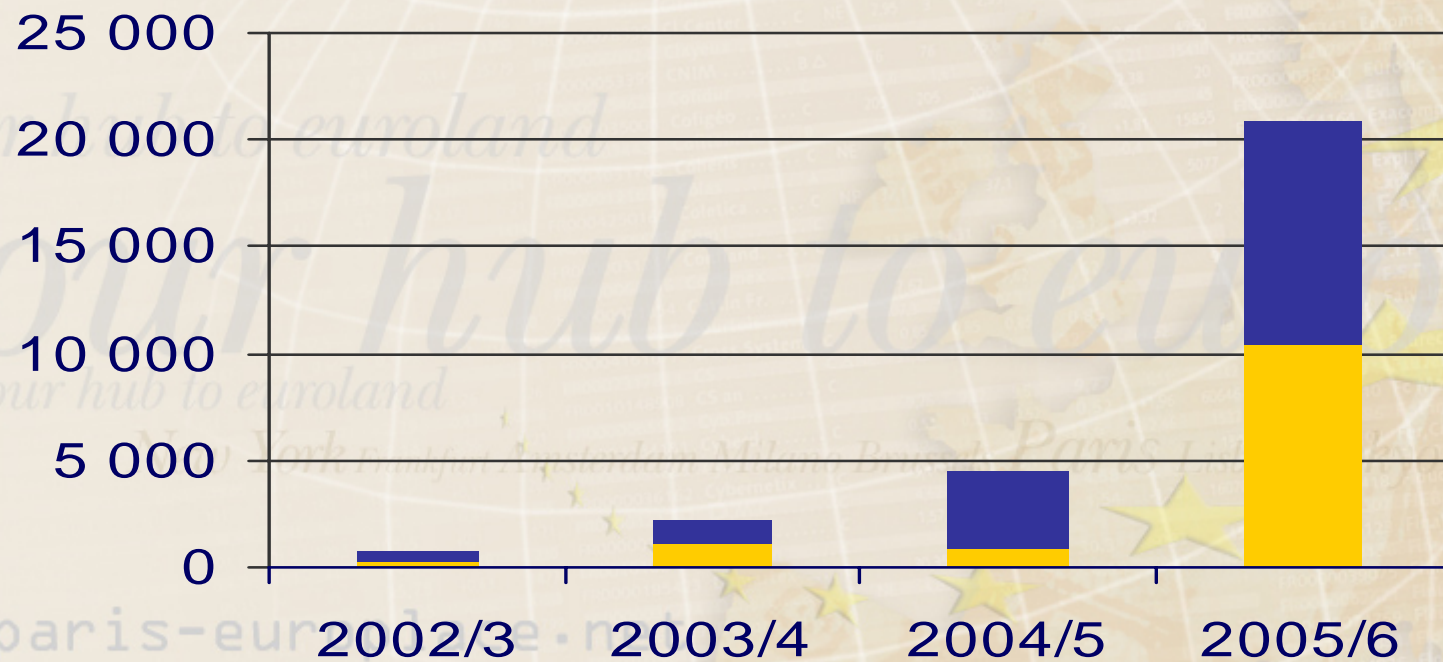
Market figures: Distribution of Number of Contracts by Type (OTC)



Market figures: Total Notional Value (OTC)

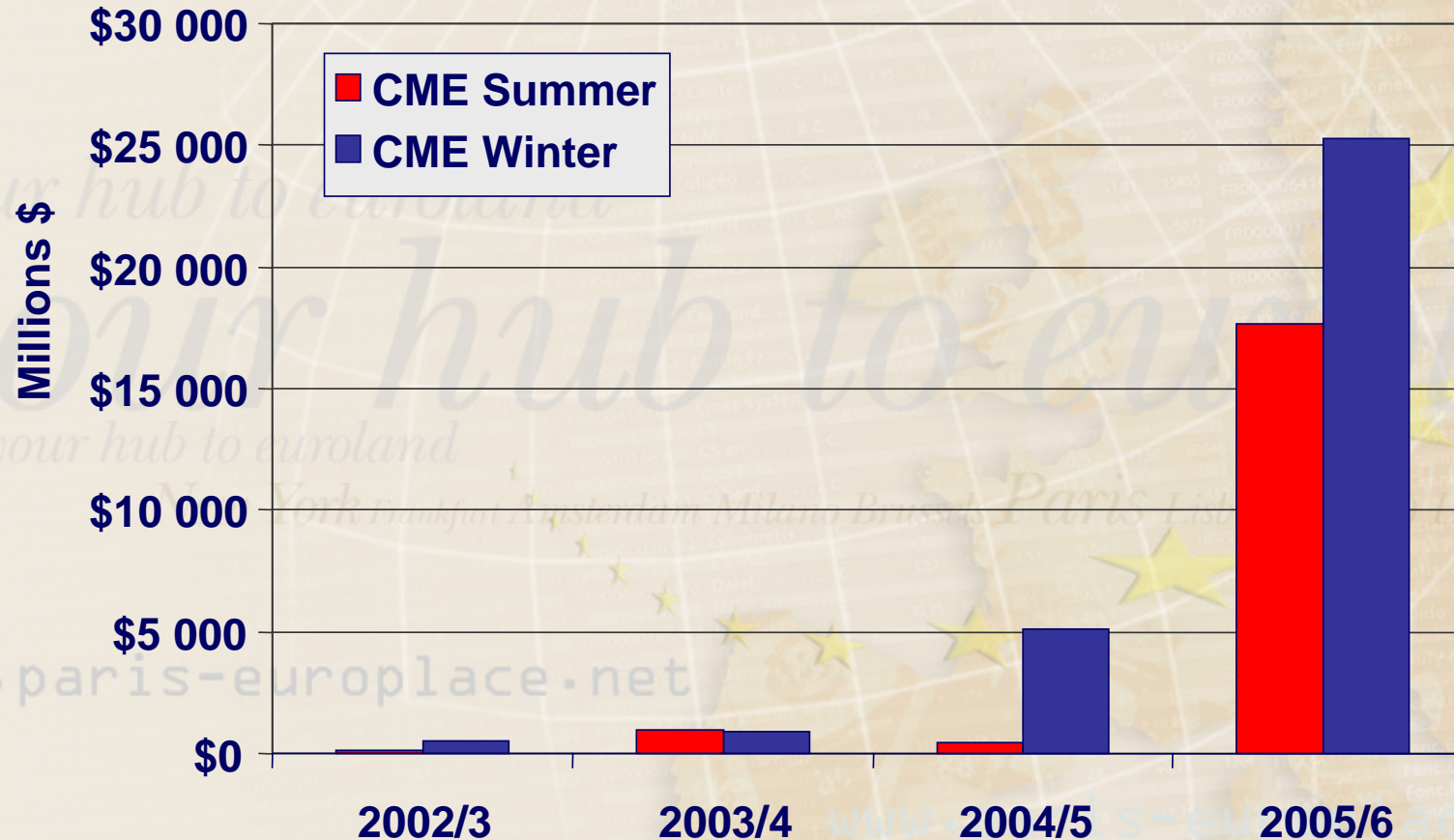


Market figures: Number of Trades on the CME



■ Summer ■ Winter

Market figures: Total Notional Value on the CME



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