



# Cost Saving Solution on the Natural refrigerants for commercial freezers

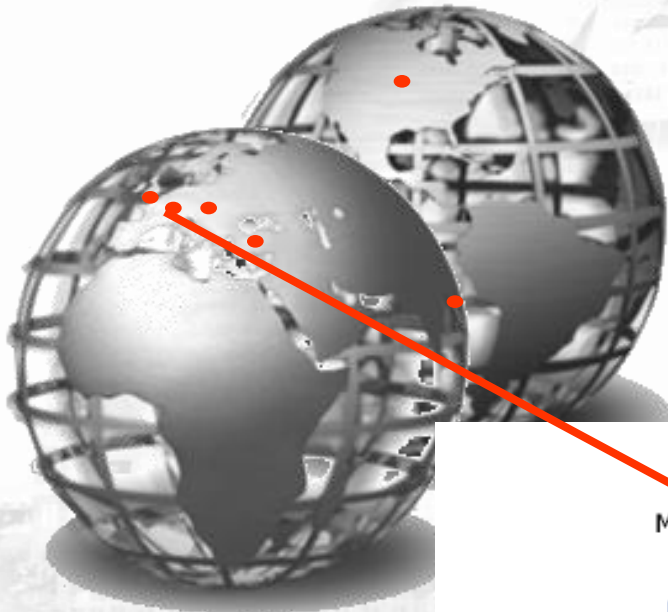
*Practical experience*

Bangkok, 2013.06.28

**Sumitra Eksithichai**  
AHT Cooling Systems, Sales Director

# AHT

# 奥特 AHT



- AUSTRIA (Headquarter)
- Germany
- Great Britain
- USA
- Turkey
- Hong Kong
- China
- Spain
- Brazil
- India



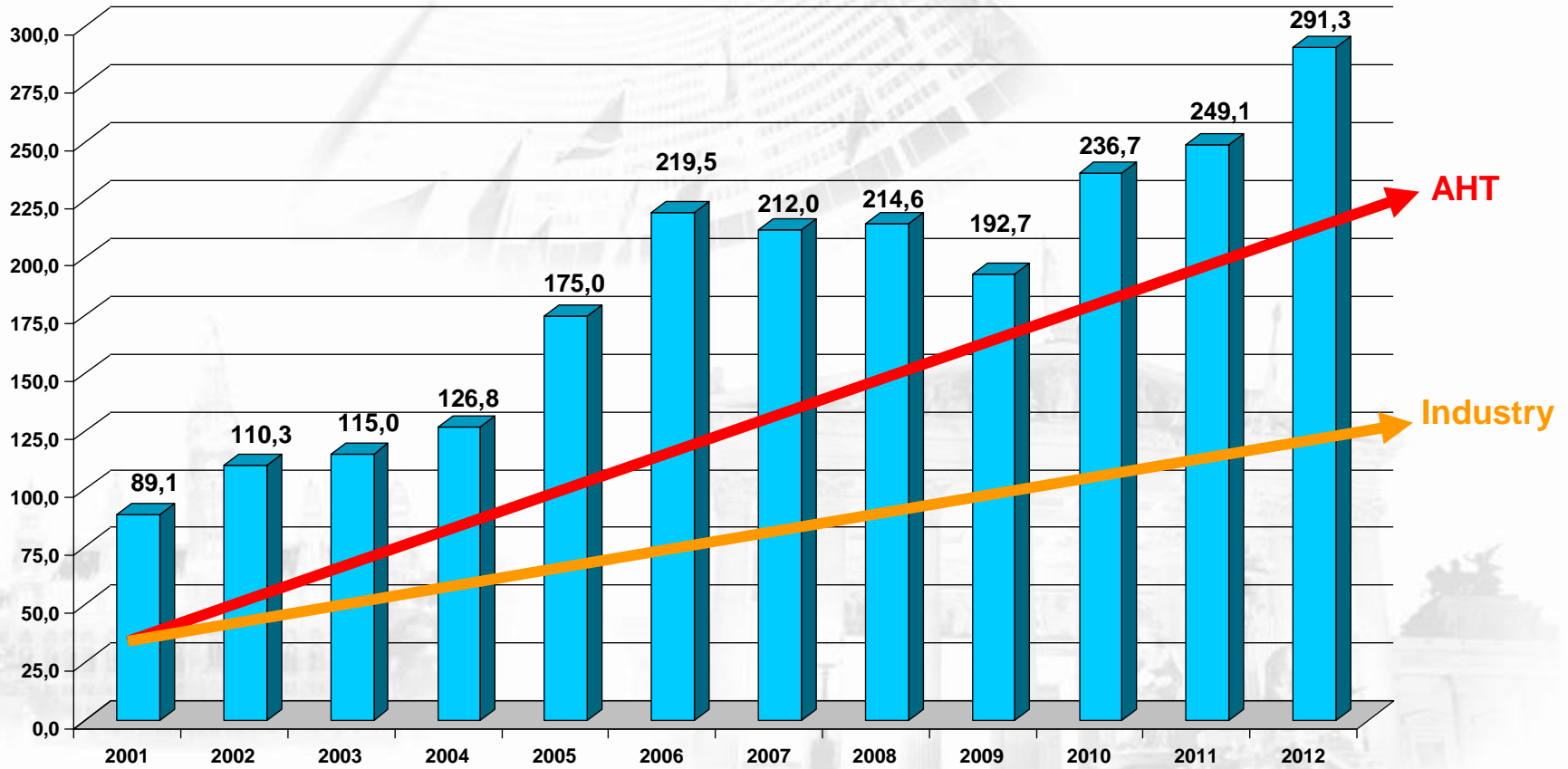
# Factories in Austria and China



Quality management  
according ISO 9001:2008

Environment management  
according ISO 14001:2004

# Turnover



Athen XL

Manhattan

**Supermarket**

**NEW**

Miami ECO

Athen XL ECO

Salzburg

R 290

Paris

# Supermarket installations worldwide



Korea



Germany



Fresh & Easy, USA

More than  
530.000 cabinets with R290  
supplied to all over the  
world

# Supermarket installations worldwide

## Key features in general

- stand-alone cabinets or banked together in an isle
- environmental friendly
  - natural refrigerant **and** low energy consumption
  - the cabinets keep products in perfect temperature
- significant energy savings compared to remote systems
- 60% reduction in running costs compared to open top freezers
- available with internal light
- low capital costs
- large volume capacity
- best visibility due to curved lids and lowered front edges
- flexibility in the store (plug in solution)

# Supermarket installations Thailand





## Key features in Thailand (SIAM MAKRO Thailand)

- installations with R290 since 2007,
- with ECO and LED version since 2013
- total numbers of installed cabinets 2750 units
- in average 64 units per store, the largest with 120 units

## Store information / feed back

- significant electricity savings
- product temperature  $-18^{\circ}$  to  $-22^{\circ}$  (@  $25^{\circ}$  C; 60%)
- no AC during the night time
- performance is very well
- very low failure-rate and no maintenance

# Benefits of natural refrigerants

**TEWI** = total equivalent of warming impact

- **TEWI – influences**

- direct influences

TEWI =


**Natural refrigerants**

- indirect influences

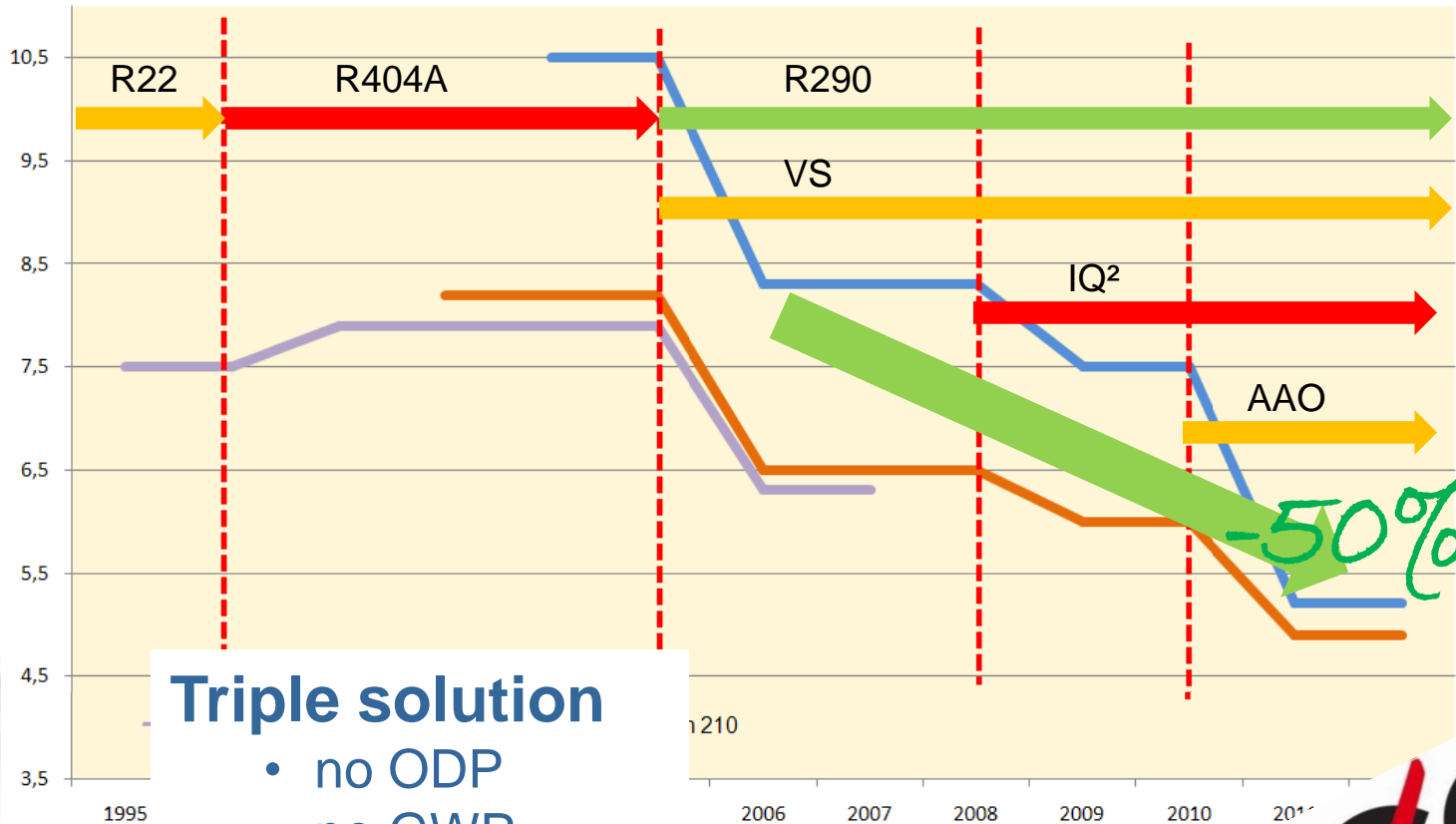

 (n x E x beta)

- energy consumption



**Reduction of the energy consumption**

# Energy consumption in kWh/24h



## Triple solution

- no ODP
- no GWP
- minimal TEWI



| TCO CALCULATION COMPARISON                                    |                                    |                            |                            |
|---|------------------------------------|----------------------------|----------------------------|
| Store C   |                                    | Remote units without GL    |                            |
| Store B   |                                    | Remote units with GL       |                            |
| Store A: Reference Cabinets AHT:                              |                                    | ATHEN XL ECO VS (AD)       |                            |
|   | 8 x 210 XL, 2 x 175 XL, 2 x 207 XL |                            |                            |
| Parameter/Calculation   | AHT ATHEN XL ECO AWA               |                            |                            |
| Net volume/storage capacity                                   | 10.200 l                           | 8.200 l                    | 8.200 l                    |
| Product presentation area (TDA)                               | 20,46 m <sup>2</sup>               | 20,65 m <sup>2</sup>       | 20,65 m <sup>2</sup>       |
| Total energy consumption<br>(with remote incl. external unit) | 78 kWh/24h                         | 204 kWh/24 h               | 291 kWh/24h                |
| Energy consumption per litre of net volume                    | 0,00764 kWh/24 h                   | 0,0218 kWh/24 h            | 0,0311 kWh/24h             |
| Base area   | 25,15 m <sup>2</sup>               | <b>24,82 m<sup>2</sup></b> | <b>24,82 m<sup>2</sup></b> |
| Investment costs (incl. setup/installation)                   | Euro 29.800,--                     | Euro 80.200,--             | Euro 62.600,--             |
| <b>Annual maintenance costs</b>                               | <b>Euro 0,--</b>                   | <b>Euro 1500,--</b>        | <b>Euro 1500,--</b>        |
| Refrigerant loss annually                                     | 0%                                 | > 5 %                      | > 5 %                      |
| <b>Defrost cycles</b>   | <b>2 x per week</b>                | <b>7-14 x per week</b>     | <b>14-28 x per week</b>    |
| <b>10 Year Calculation</b>                                    | <b>Euro</b>                        | <b>Euro</b>                | <b>Euro</b>                |
| Depreciation of 90 % of the purchase price                    | 26,820.00                          | 72,180.00                  | 56,340.00                  |
| Energy costs in 10 years, 9 ct/kWh                            | 25,623.00                          | 67,014.00                  | 95,593.50                  |
| Disposal costs  | 1,250.00                           | 5,000.00                   | 5,000.00                   |
| <b>Maintenance costs</b>                                      | <b>-</b>                           | <b>15,000.00</b>           | <b>15,000.00</b>           |
| <b>TCO (Total Cost of Ownership)</b>                          | <b>53,693.00</b>                   | <b>159,194.00</b>          | <b>171,933.50</b>          |



**Thank you**



**your “freshness partner” worldwide**