



Supermarket Refrigeration Technologies and Trends in Europe

Biography: Darren C. Lacroix

International Sales Director, **Advansor**
by **Hill Phoenix**



Darren Lacroix is a Mechanical Engineer and is specialised in commercial refrigeration development since 2005. He has held operational and strategic management positions with several global corporations in commercial, marketing and technical services for HVAC and R, more recently with a focus on CO₂ exclusively. Darren is the International Sales Director for Advansor, the World leader in design and manufacture of transcritical CO₂ booster systems.

Since November 2011, Advansor was acquired by Hill Phoenix. Darren is thrilled with the new commitments in making CO₂ a global commercial technology.

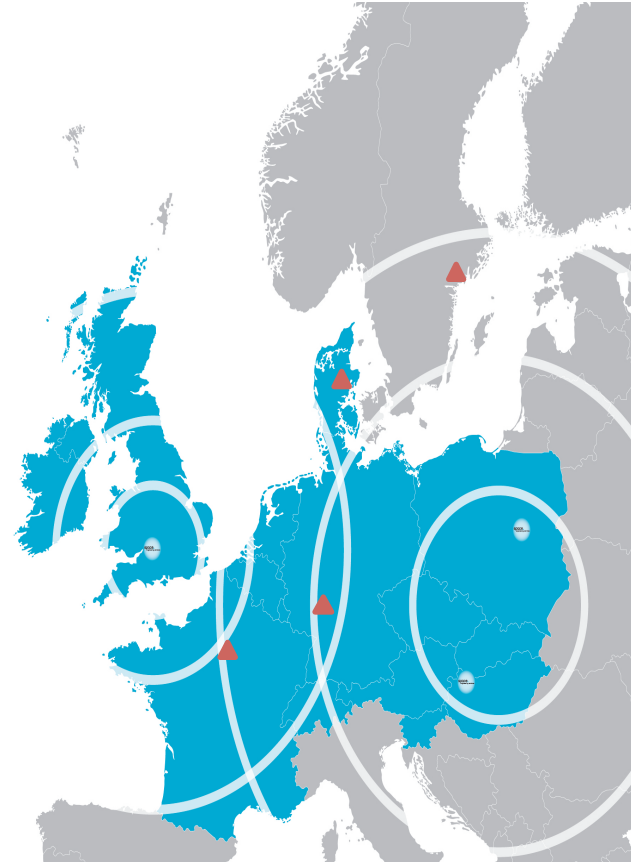
About ADVANSOR

- The Worlds largest producer of transcritical booster-systems.
- Uses CO₂ to fight Global warming
- Market leader on booster systems
- OEM and NOT an installation company
- Production of 10 systems per week
- Production area: 3500 m²
- Employees: 65 (+40 at sub contractors)
- Production per. year: 300 -400 systems
- Production capacity max. 500 systems/year
- Reference list: +1000 systems operating in 16 countries

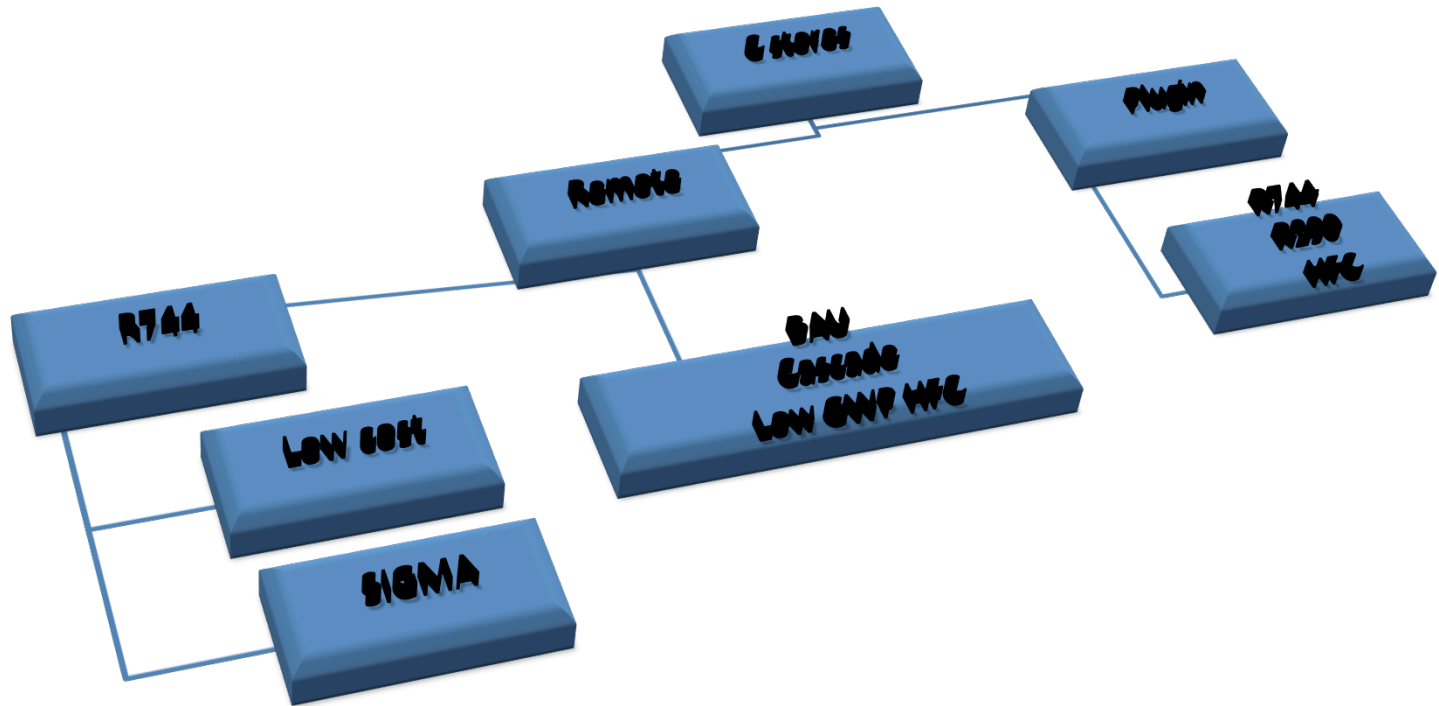


How we operate in Europe with Space Eng Services

- Advansor Headquartered in **Denmark**
- Space Engineering Services Headquartered in **Bristol**
- **1** Denmark and **1** UK Manufacturing facilities
- Strategically located support offices in **Paris, Frankfurt, Stockholm, Gyor and Warsaw**
- **Centrally** controlled, **Locally** delivered
- We educate and rely on strong partnerships
- Trends covered:
 - Systems only
 - Turnkey

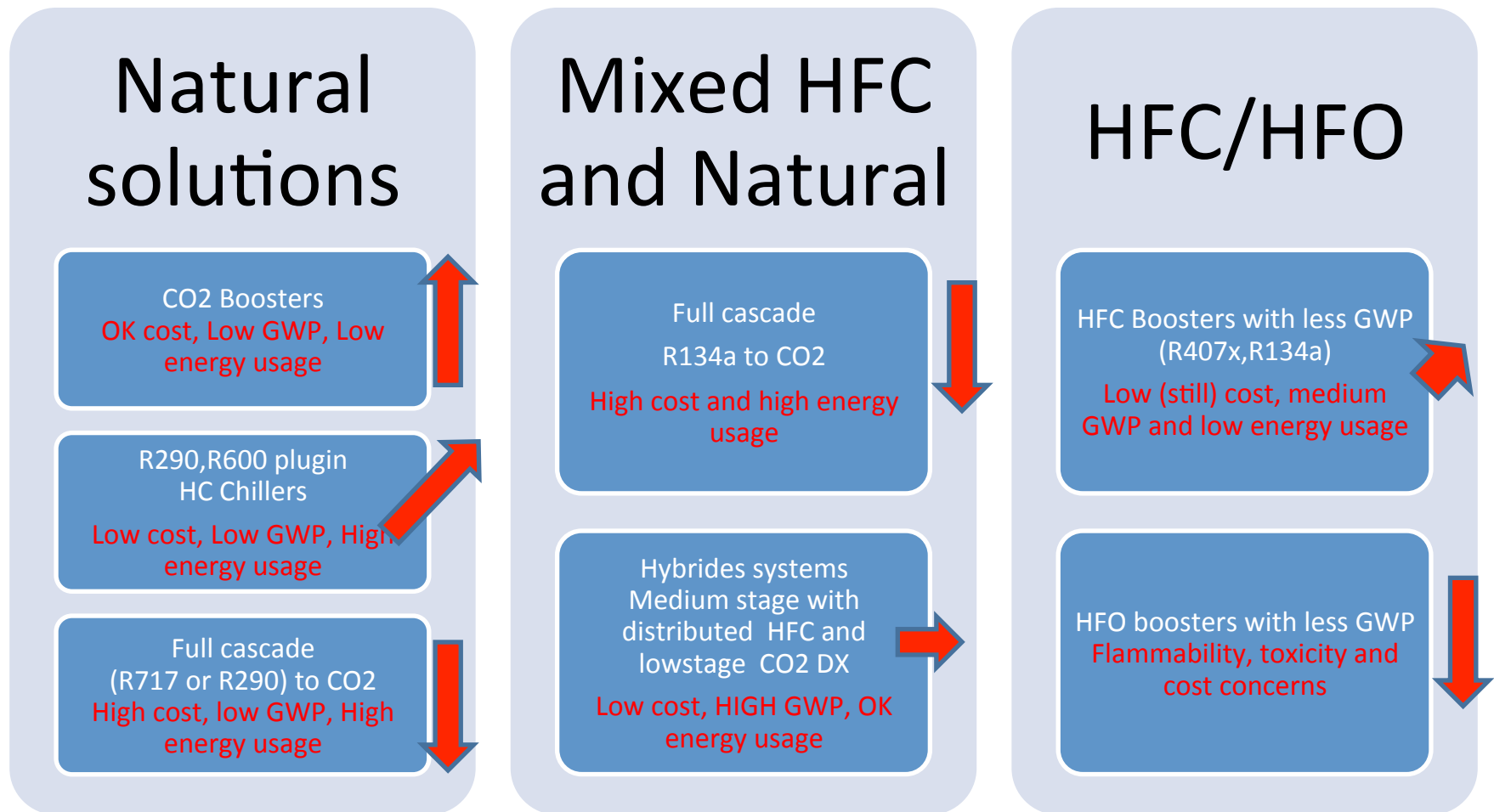


Trend 1 C stores (towards Fgas compliance)



Trend 1 European Refrigeration Technologies

Supermarkets towards F gas compliance



Trend 2 :Energy consumption

| City | Transcritical CO2 simple booster [kWh] | HFC 404A [%] | HFC indirect systems [%] | Cascade (R134/CO2) [%] |
|-----------|--|--------------|--------------------------|------------------------|
| Stockholm | 200.272 | +10 | +36 | +20 |
| København | 203.228 | +9 | +36 | +20 |
| Oslo | 201.309 | +9 | +36 | +20 |
| Amsterdam | 215.477 | +6 | +34 | +18 |
| Berlin | 223.761 | +4 | +30 | +15 |
| Paris | 233.269 | +1 | +27 | +13 |
| Lyon | 245.977 | -1 | +23 | +9 |
| Madrid | 271.159 | -4 | +19 | +6 |
| Marseille | 279.484 | -7 | +17 | +3 |
| Barcelona | 282.695 | -8 | +16 | +3 |
| Rom | 289.547 | -8 | +14 | +1 |

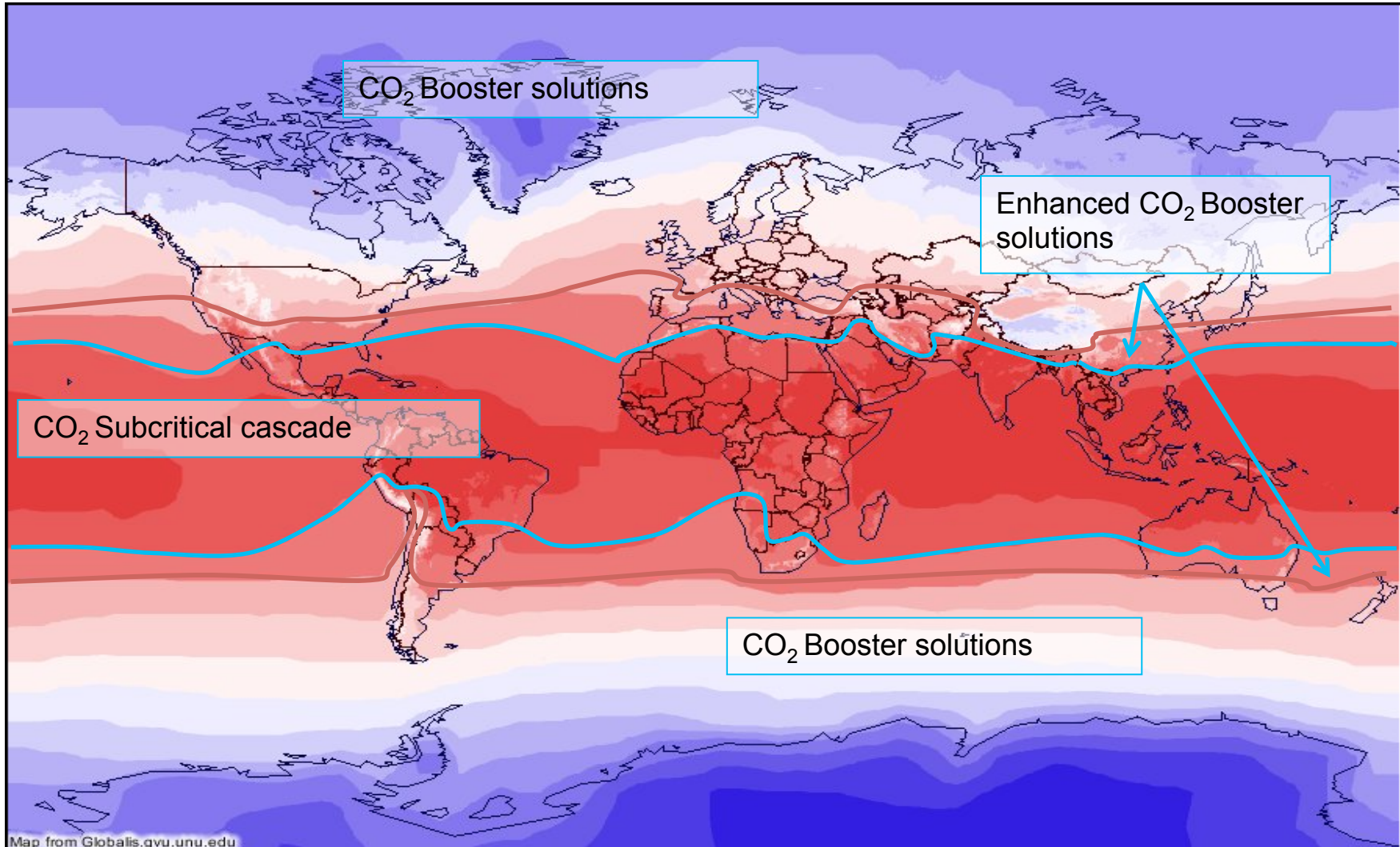
Reference: DTU, Technical University of Denmark (IPU)

Trend 2 Focus on Energy, Warm Climate Solutions for Central and South Europe

- High pressure sub coolers
- Parallel Compression systems
- Water spray systems
- Adiabatic air cooling curtains



World CO2 Energy Map by Danfoss



Trend 3: Focus on 1st cost

Small capacity and Cost Optimised Requirements



3-10 kW with CO₂
MT or LT, single temperature
Single compressor units



40+10 kW with CO₂
MT and LT dual temperature
Max 5 compressors per unit

Trend 4: More technology on board

SIGMA – all in one Advanced technology for better total performance

- Plug & Play Total Energy Management System
 - MT & LT
 - AC
 - Full heat recovery with A2W heat pump
- Best in Class Energy Performance with Parallel Compression





n e t w o r k

natural refrigerants

17 July 2014 in Paris, France

Thank you very much!