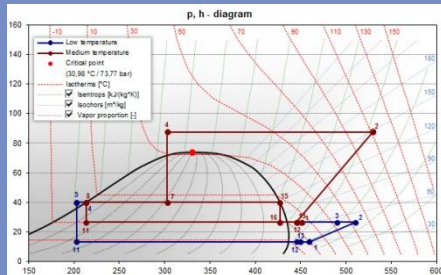


The Ahold steps to Proven Sustainability



On the Road to CO₂ Neutral

By Michel de Rooij

Ahold Responsible Retailing

- **3,074 Stores in Europe and USA**
- **225,000 Employees, Serving 80 million People**
- **Net Sales € 32.8 Billion**
- **Reduce CO₂ emissions by 20% per m² Sales Area by 2015 (ref. 2008)**
- **NL: 257 Hybrid R134a/CO₂ Systems, no Natural Gas for Heating**
Refrigerant Leakage Rate 6,6%
3 CO₂ Transcritical Systems operational, 3 Final Pilots
- **CZ: 10 Hybrid R134a/CO₂ Systems**
- **USA: Piloting CO₂ Hybrid Systems**

Switch to Natural Refrigerants by 2015

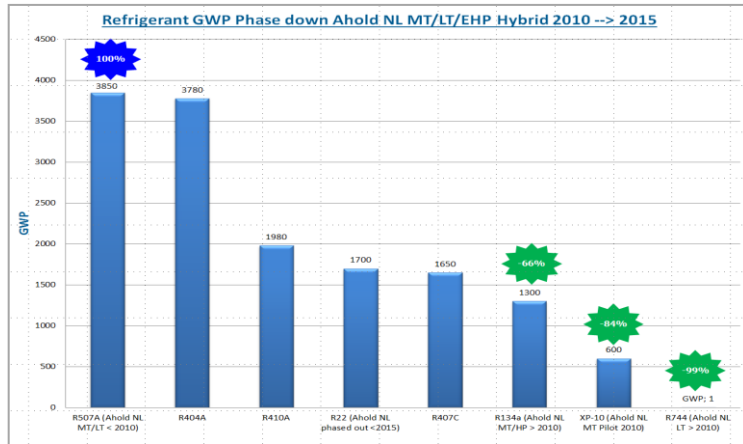
Framework System Development

- **Installed Base operating within EU- and Local Legislation**
- **Fulfillment Promises & Targets Ahold/Albert Heijn**
- **Lower LCCP & TCO**
- **Next Week Open**

Desk Research

- **Energy and CO₂ flows**
- **Market Possibilities, Components, Companies**
- **Installed Base Effects**
- **Concept PoD**

Models and Predicting



GWP Phase Down Model

Preview refrigerants 2013 - 2030 (est. charge > 50 T CO2 eq.) based on FP-Gas II Component/Amendments Bas Eindhoven 12.05.2013 (ruim 600 MT/00 2013) (2 jps, 17.05.13.14)

Refrigerant type	AH WWK kgp 30.10.2012	Formule	GWP acc. F-Ges II	Composition				End of Design	Design	GWP (2013)	GWP (2030)
				%	substant	%	substant				
R717 (natural refrigerant)	0	NH3	0	100.0%	R717					0	0
R744 (natural refrigerant)	0.007	CO2	1	100.0%	R744					1	1
R290 (natural refrigerant)	n.a.	CH3CH2CH3	3	100.0%	R290					3	3
R134a	73.551	CH2FCF3	1.430	100.0%	R134a					1.430	1.430
R123 (design R134a, 2013/16)	0	Blend (blend)	n.d.	n.d.	n.d.					n.d.	n.d.
R404C	68	Blend	1.774	23.0%	R12	35.0%	R115	32.0%	R134a		
R407C	17	Blend	1.835	40.0%	R12	30.0%	R115	30.0%	R134a		
R410A	n.a.	Blend	2.088	50.0%	R12	30.0%	R115				
R427A	0	Blend	2.138	11.0%	R12	35.0%	R115	10.0%	R134a	30.0%	R134a
R438A	0	Blend	2.265	8.0%	R12	45.0%	R115	44.0%	R134a	1.0%	R22
R417A	553	Blend	2.346	40.0%	R12	30.0%	R115	1.4%	R22	0.6%	R22
R422D	0	Blend	2.729	55.0%	R12	35.0%	R134a	1.4%	R22		
R422A	0	Blend	3.143	55.0%	R12	35.0%	R134a	1.4%	R22		
R404A	1.222	Blend	3.322	44.0%	R12	30.0%	R134a	1.0%	R22		
R507A	176.855	Blend	3.383	50.0%	R12	30.0%	R134a				
R22 (< 01.01.2015)	9.943	CHClF2	1.100	100.0%	R22					1.100	1.100
R600a (R600) (< 01.01.2015)	53	Blend	2.746	60.0%	R12	2.0%	R22	30.0%	R22		

LCCP Model

Methode 1. (Meerinvestering gedeeld door besparing TCO per jaar)

Analyse Philips LED Excel matrix 20 aug. 2013 .xlsx

0-winkel 1.450 m2 WVO: Verlichtingsplan periode = 10 jaar.

	Investering	Verbruikskosten (energie + lamp)	Totaal	Besparing t.o.v. conv. TCO	Meerinvestering	TVT incl gar.	CO2-emissie
a. Conventioneel	€ 42.302	€ 144.151	€ 196.453	-	-	679 Ton	
b. LED (100 -> 70%)	€ 61.136	€ 71.730	€ 149.866	€ 46.587	€ 18.834	4,0 406 Ton	
c. LED (100 -> 70% + controls)	€ 68.636	€ 60.980	€ 146.616	€ 49.837	€ 26.334	5,3 345 Ton	
d. LED (130 -> 100% + controls)	€ 75.816	€ 77.030	€ 169.846	€ 26.607	€ 33.514	12,6 436 Ton	
Voorbeeld:							
a. TCO in 10 jaar	€ 196.453						
b. TCO in 10 jaar	€ 149.866						
Besparing in 10 jaar	€ 46.587						
a. Investering	€ 42.302						
b. Investering	€ 61.136						
Meerinvestering b. is	€ 18.834						
TVT is (meer)investering	€ 18.834	gedekt door TCO besparing	€ 4.659	=	4,04 jaar		

TCO Model

Ahold Europe

Installation Partner

Forecast yearly energy consumption: 190.059 kWh

Energy consumption / m2: 130.89

Temperature	Hours/Year	Hours measured	Consumption/Year	Consumption/Year
18.0	876	0	0	0
19.0	876	0	0	0
20.0	876	0	0	0
21.0	876	0	0	0
22.0	876	0	0	0
23.0	876	0	0	0
24.0	876	0	0	0
25.0	876	0	0	0
26.0	876	0	0	0
27.0	876	0	0	0
28.0	876	0	0	0
29.0	876	0	0	0
30.0	876	0	0	0
31.0	876	0	0	0
32.0	876	0	0	0
33.0	876	0	0	0
34.0	876	0	0	0
35.0	876	0	0	0
36.0	876	0	0	0
37.0	876	0	0	0
38.0	876	0	0	0
39.0	876	0	0	0
40.0	876	0	0	0
41.0	876	0	0	0
42.0	876	0	0	0
43.0	876	0	0	0
44.0	876	0	0	0
45.0	876	0	0	0
46.0	876	0	0	0
47.0	876	0	0	0
48.0	876	0	0	0
49.0	876	0	0	0
50.0	876	0	0	0
51.0	876	0	0	0
52.0	876	0	0	0
53.0	876	0	0	0
54.0	876	0	0	0
55.0	876	0	0	0
56.0	876	0	0	0
57.0	876	0	0	0
58.0	876	0	0	0
59.0	876	0	0	0
60.0	876	0	0	0
61.0	876	0	0	0
62.0	876	0	0	0
63.0	876	0	0	0
64.0	876	0	0	0
65.0	876	0	0	0
66.0	876	0	0	0
67.0	876	0	0	0
68.0	876	0	0	0
69.0	876	0	0	0
70.0	876	0	0	0
71.0	876	0	0	0
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81.0	876	0	0	0
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87.0	876	0	0	0
88.0	876	0	0	0
89.0	876	0	0	0
90.0	876	0	0	0
91.0	876	0	0	0
92.0	876	0	0	0
93.0	876	0	0	0
94.0	876	0	0	0
95.0	876	0	0	0
96.0	876	0	0	0
97.0	876	0	0	0
98.0	876	0	0	0
99.0	876	0	0	0
100.0	876	0	0	0
Total	8760	8887		

Prediction Model CO2/TC System

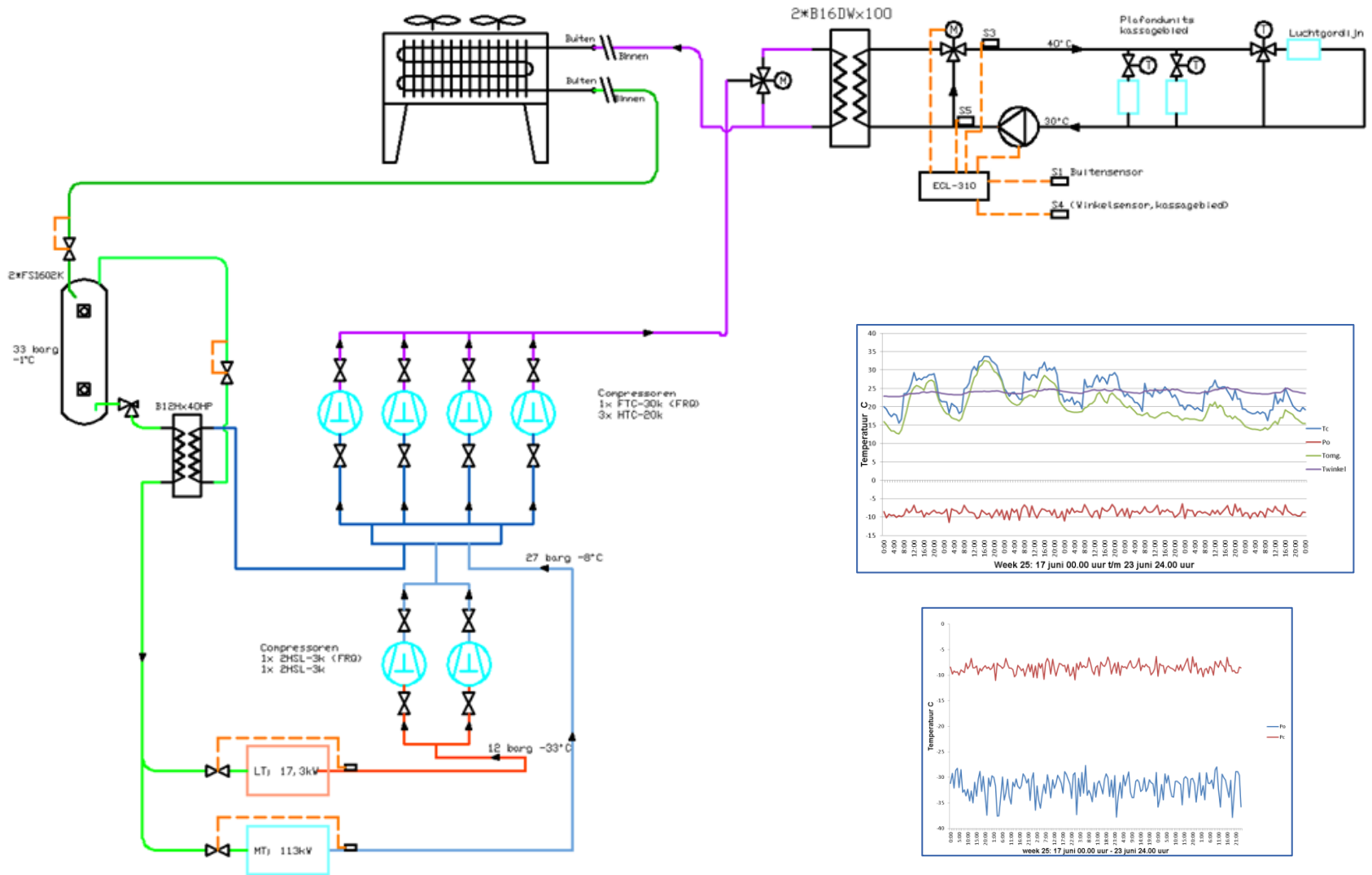
Development under competition

- **Program of Demand Discussion with 3 Contractors**
- **Benchmark Contractors and Installations**
- **Update Models and PoD**
- **Collect 3 Proposals from the Contractors**
- **Building 3 State of the Art Installations**

Follow up and Improvement

Keeping Control during Lifecycle

Development (example)



Results and Achievements

- **Installations according Laws and Regulations**
- **Fulfillment Promises and Goals Ahold/Albert Heijn**
- **Reduce LCCP, TCO (CAPEX/OPEX), preserving High Quality Standards**
- **Total Heating by Cooling System, Ending Natural Gas Consumption**
- **Pro-Active Grip on Energy and Environmental Subjects**
- **Switch to Natural Refrigerants end of 2014**

Challenges

- **Availability and Price Level of CO₂ Installation Parts**
- **CO₂ Components for Small Systems and Convenience Stores**

Thank you very much

 **ATMO**
EU sphere
solutions for europe
natural refrigerants
15-16 October 2013, Brussels

