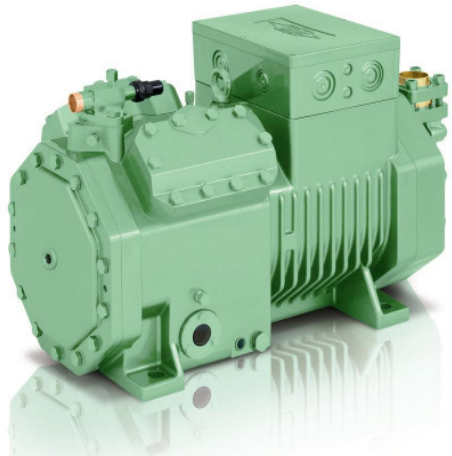


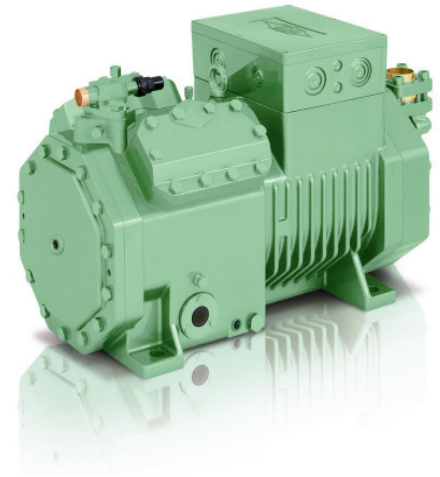
BITZER ECOLINE -
The R134a Compressor Series

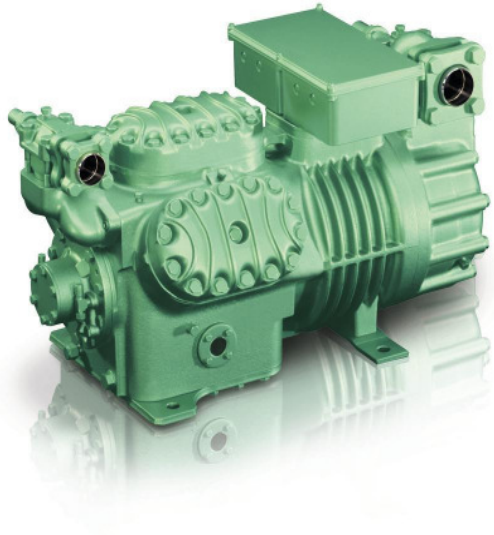
Product information

Agenda

Product Information

- Product range BITZER ECOLINE
- Product features
- Payback period
- Summary

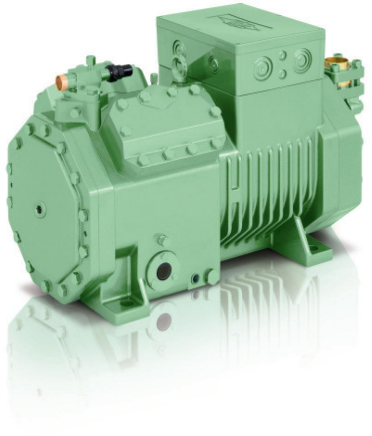




Product range - BITZER ECOLINE

Product range comprises:

- ❑ 12 Capacity steps
- ❑ 2 Motor versions



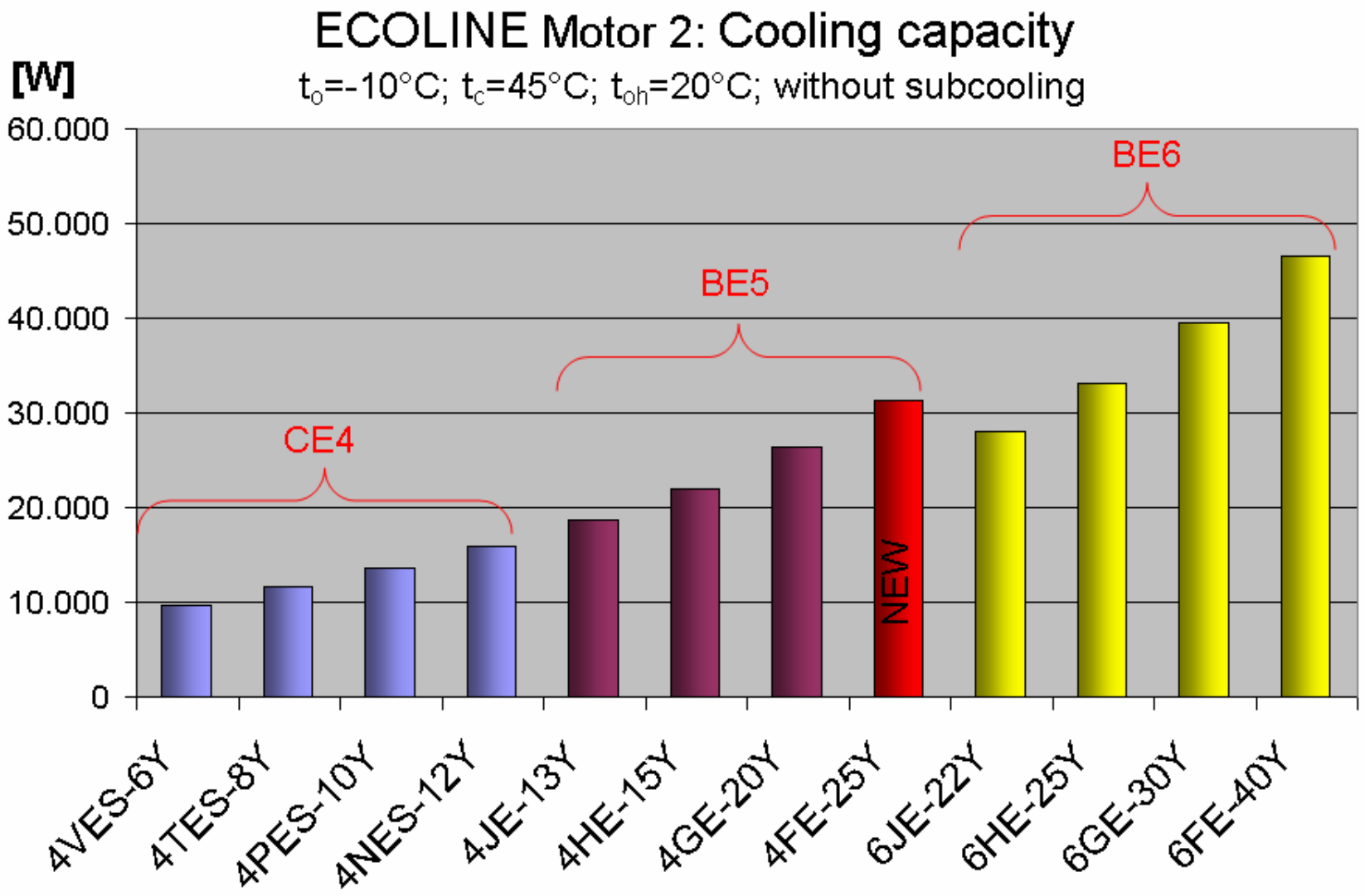
Example for designation:

Standard Series		
Type	Motor Version	m^3/h*
4NCS-12.2Y	2	56,2
4NCS-20.2Y	1	
6F-40.2Y	2	151,6
6F-50.2Y	1	

BITZER ECOLINE		
Type	Motor Version	m^3/h*
4NES-12Y	2	56,2
4NES-20Y	1	
6FE-40Y	2	151,6
6FE-50Y	1	

* Displacement @ 50Hz

Product range - BITZER ECOLINE$_{II}$



Product range - BITZER ECOLINE$_{III}$

Enlargement to lower Condensing temp.

Example: t_o = -10°C

4NCS-12.2Y: COP= **4,12*** @ t_c=20°C

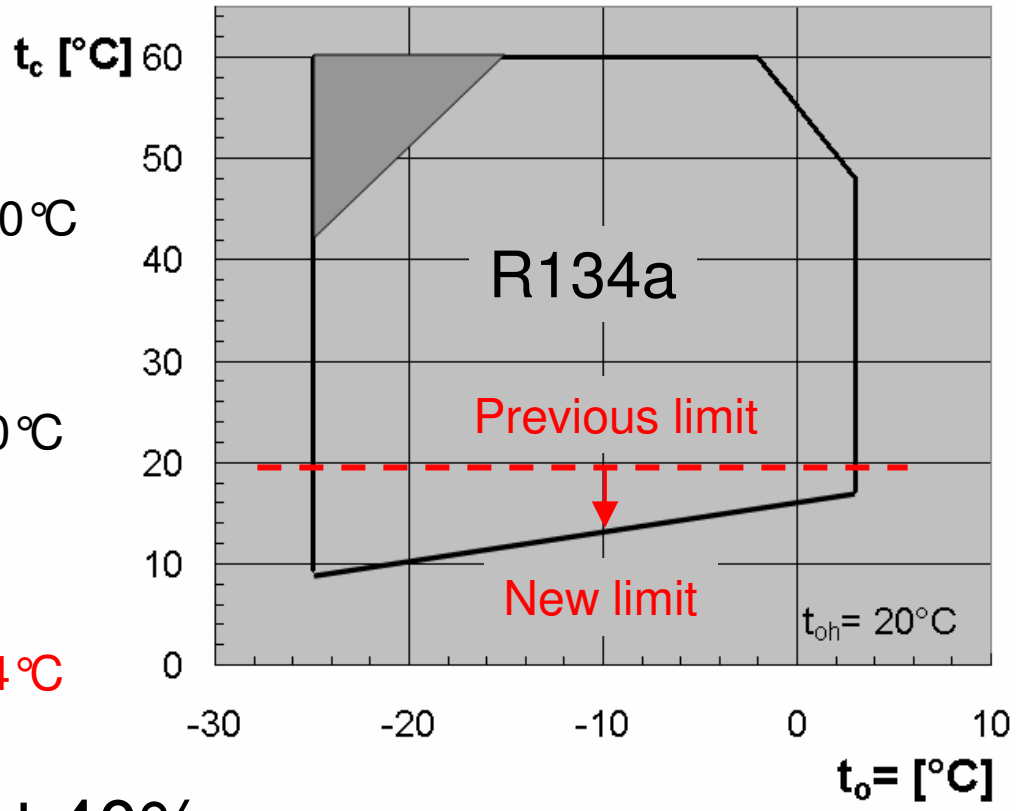
+16%

4NES-12Y: COP= **4,78*** @ t_c=20°C

+21%

4NES-12Y: COP= **5,79*** @ t_c=14°C

BITZER ECOLINE Motor 2



Total COP improvement 40%

Δt_{oh}=10K; without subcooling

* Bitzer Software 5.1.3

Product features

- Highly energy-efficient R134a compressor series for medium temp. applications with additional COP improvements at low pressure ratios
  - ➔ Energy and cost savings
- Enlarged application limits to lower condensing temperatures
  - ➔ Strong reduction in amortization time
- Low vibration levels and sound emissions
  - ➔ Simple in use and installation
- Higher maximum condensing temperature
  - ➔ Additional safety margin for hot summer days
- Useable with standard motor for inverter operation up to 70Hz
  - ➔ Inverter operation with smaller inverter and lower investment possible

Payback period

Assumptions

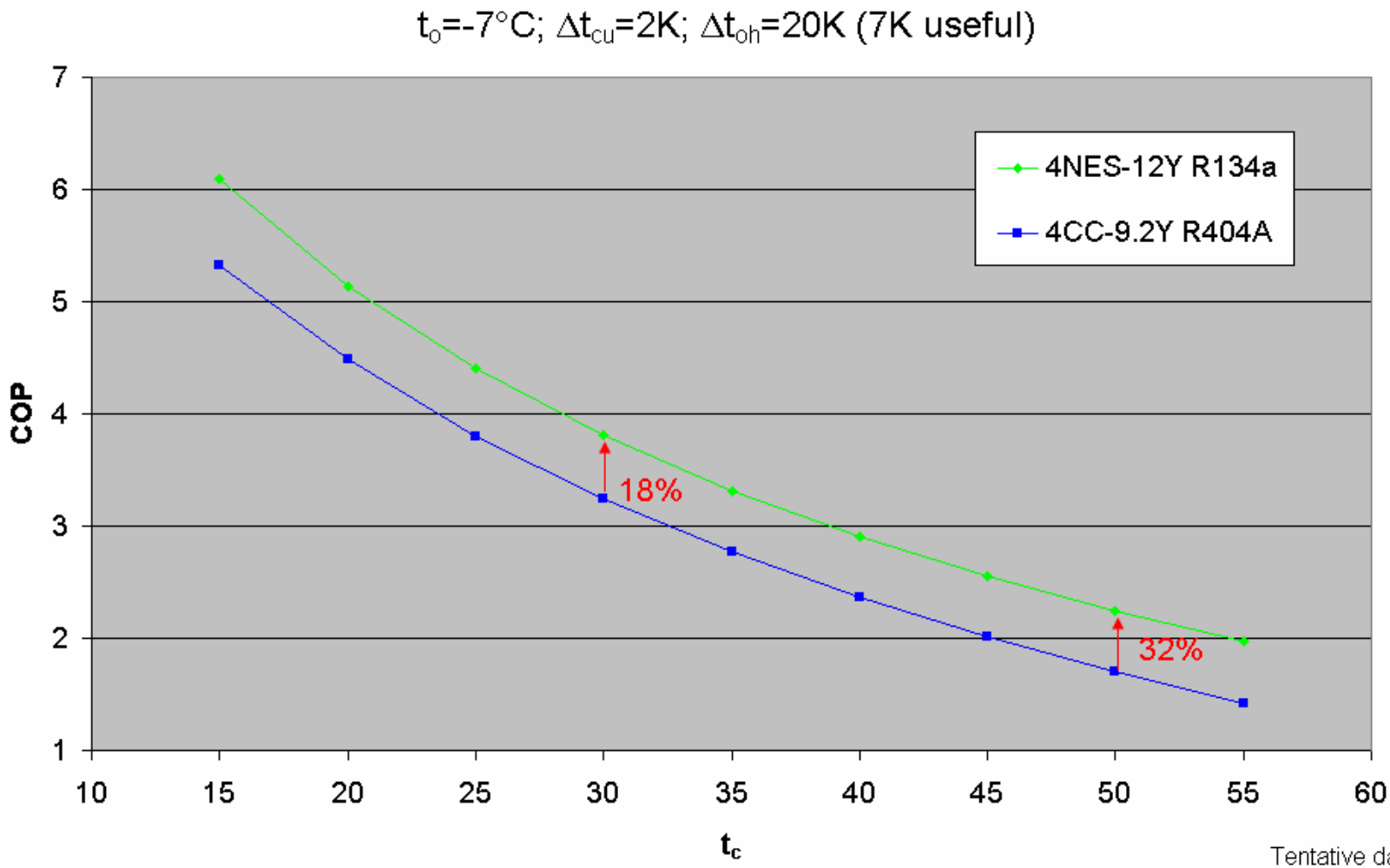
Cooling capacity: 47 kW / constant cooling load
Selection conditions: t_o=-7 °C, t_c=30 °C…50 °C, Δt_{Cu}=2K, Δt_{oh}=20K / useful 7K
Installation place: Karlsruhe - Germany
Electricity charge: 0,15 €/kWh
Condenser selection: t_{amb}-t_c= 10K

	BITZER ECOLINE **3x 4NES-12Y**	**Standard Series** **3x 4CC-9.2Y**
Capacity*	51,7 kW	47,8 kW
Refrigerant	R134a	R404A

*Nominal condensing temperature t_c=45 °C

Payback period$_{II}$

The BITZER ECOLINE 4NES-12Y provides COP improvements within the entire MT operation range



Payback period III

	BITZER ECOLINE 4NES-12Y	Standard Series 4CC-9.2Y	Change to standard series
Electrical energy demand p.a.	111.947 kWh	132.411 kWh	**- 20.464 kWh**
Electrical energy demand 10 years	1.119.470 kWh	1.324.110 kWh	**- 204.640 kWh**
Saved carbon dioxide emissions in 10 years*	689.594 kg CO_2	815.652 kg CO_2	**-126.058 kg CO_2**
Average annual comp. COP	3,68	3,11	**+ 18,3 %**

* BMU Report 07: 616 g CO_2/kWh; lower CO_2 emissions based on leakages and recovery losses aren't included

** 0,15 € /kWh

Payback period$_{IV}$

Results:

- 18,3 % higher annual COP

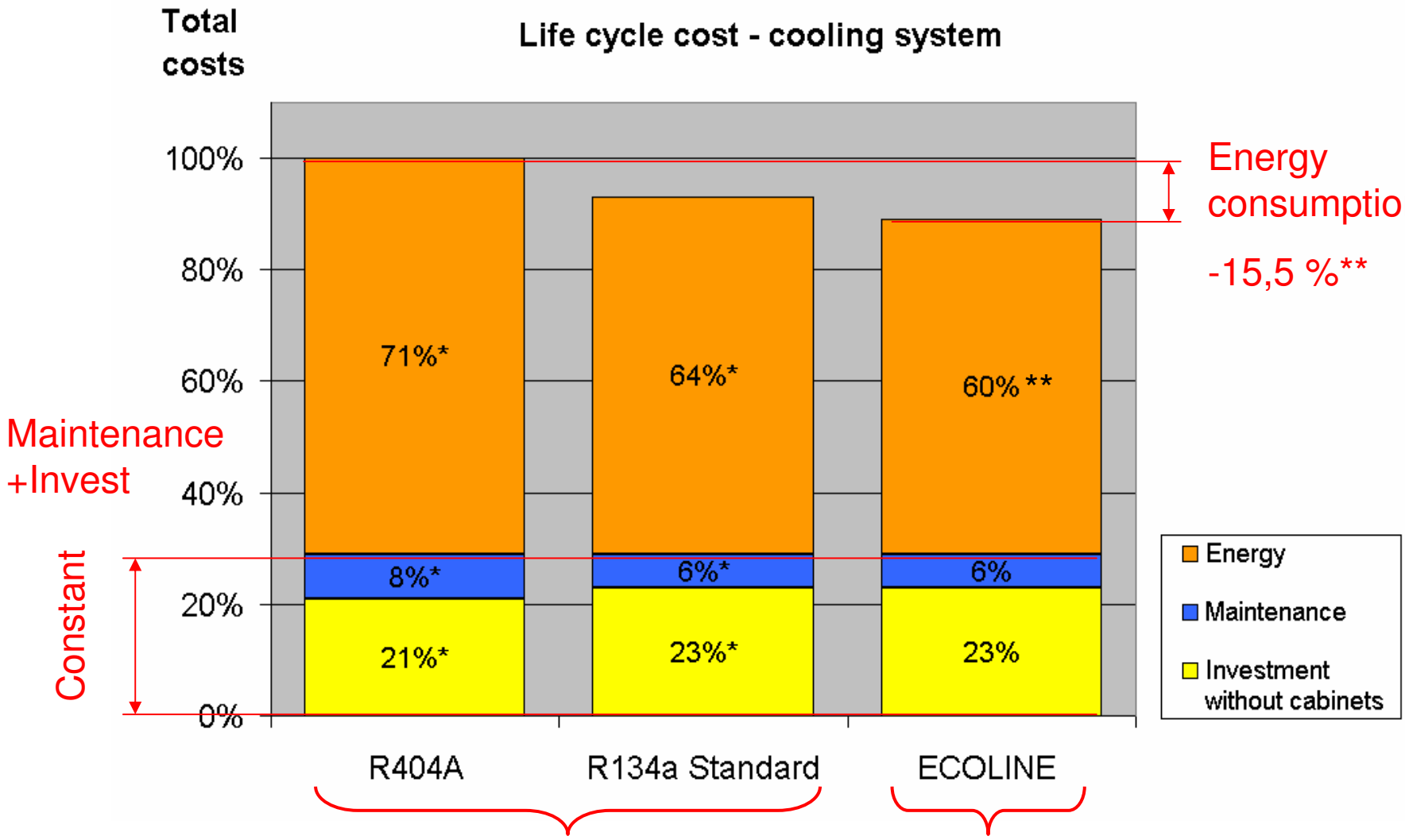
➔Payback period less than 1 year*

* Based on compressor investment

Further saving aspects not yet considered:

- Rising prices of electrical energy
- Lower costs for R134a charge
- Possible roll out of a strong R404A tax
- Reduced maintenance effort

Payback period$_V$

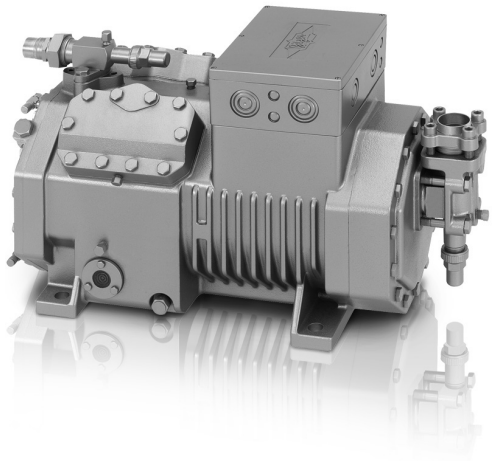


*Source: Retailer Report
International Conf. Co_2ol Food Berlin 2007

**Based on
Software 5.1.3

Summary

Customer's benefits of the BITZER ECOLINE series



- Annual COP up to 20% higher compared to conventional R404A solutions
- Payback periods typically one year or less
- Considerably reduced carbon footprint
- Ready for inverter use up to 70Hz* already with standard motor version
- Instant availability, simple installation and maintenances

* motor version 2

THE NEW ECOLINE COMPRESSORS – FUTURE-READY, ALREADY.