

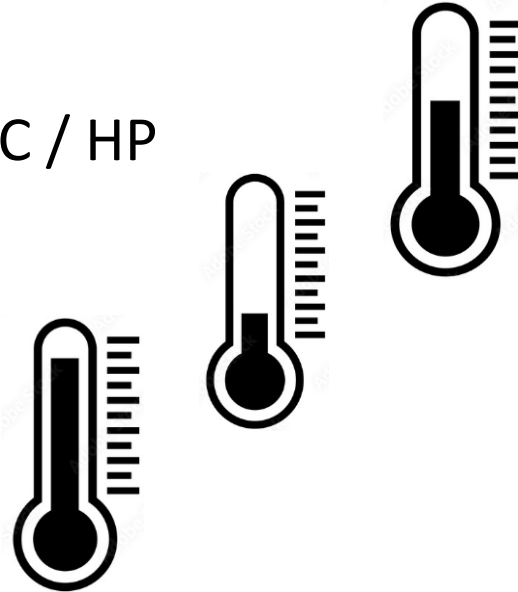
Liquid Coolers (HC)

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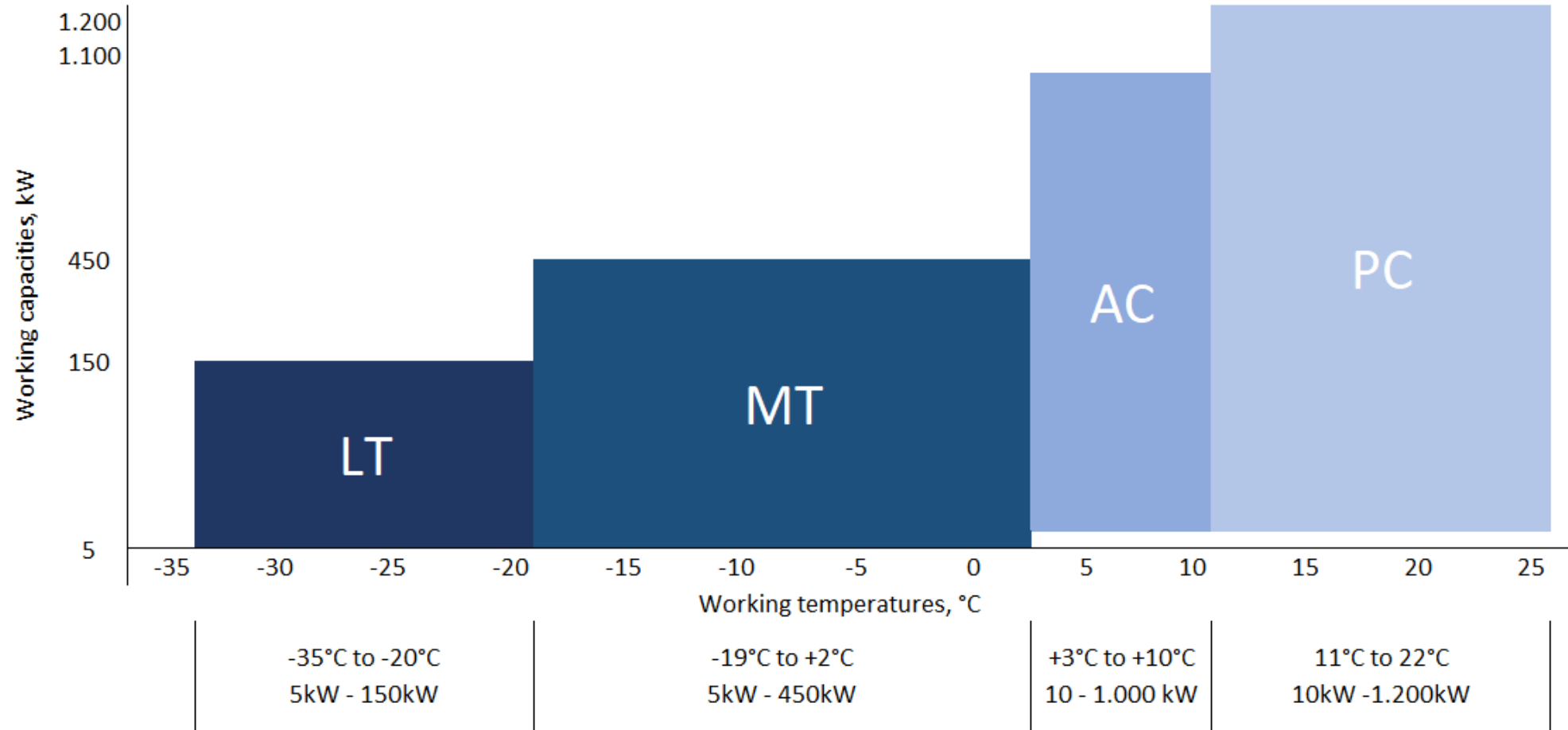
General application possibilities

- HC refrigerants (standard)
 - R290 (propane) -> MT /AC / PC / HP
 - R1270 (propylene) -> LT / MT
 - R600a (isobutane) -> HT / HP



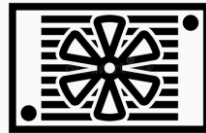
- Ambient temperatures
 - -20 to +40°C (+45°C)

General application possibilities



Application fields

- Coldstorage and Freezer



- Food Industry



- Climate simulation



- Air conditioning



- Process cooling



- Datacenter cooling



- Gas liquefaction



Case studies – LT / MT

Pharma / LT (piston compressors)
2 x 77 kW (outlet temp. -34°C)
6 kg (R1270) per circuit



Meat factory / MT (screw compressors)
2 x 515 kW (outlet temp. -8°C)
25 kg (R290) per circuit



Case studies – AC / Process

Shopping Mall / AC (screw compressors)

2 x 1.200 kW (outlet temp. +8°C)

40 kg (R290) per circuit



Production / PC (piston compressors)

1 x 600 kW (outlet temp. +12°C)

12 kg (R290) per circuit



Case studies – Water cooled - Indoor

University / AC (compact chiller)
3 x 52 kW (outlet temp. +8°C)
1,9 kg (R290) per circuit



Railway station / AC (piston compr.)
2 x 260 kW (outlet temp. +6°C)
4,5 kg (R290) per circuit

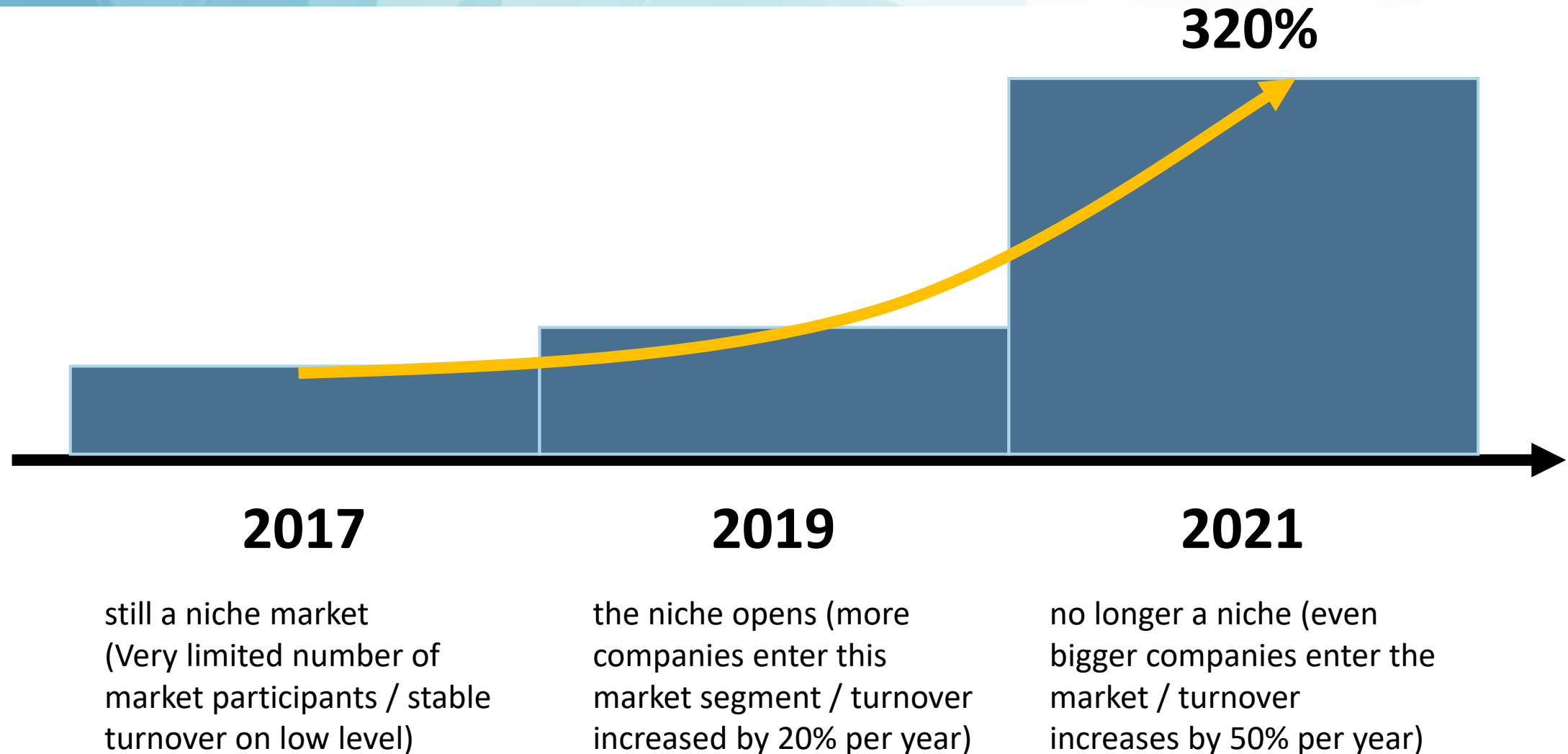


Benefits



- Wide application range (one for all)
- High efficiency (Reduction of energy costs and indirect CO2 emissions)
- Future-proof (sustainable investment)
- Hydrocarbons are cheap and independent of the chemical industry
- Safe use isn't an obstacle
- High potential for further developments/improvements

Market development - Turnover



There is no cooling application that could not be adequately covered with natural refrigerants today and therefore there is no rational reason to continue using synthetic refrigerants



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