



# ATMO sphere





## Efficient Cooler – Case Study

Eliwell by Schneider Electric

Life Is On



## Eliwell & Schneider-Electric



**The global specialist  
in energy management  
and automation**



**The expert centre and  
brand for refrigeration  
solutions**

## Efficient cooler project purposes

- Maximize efficiency in all working conditions
- Maximize cooling capacity with lower refrigerant charge
- Minimize equipment cost & complexity
- Quick & easy commissioning

# Efficient cooler project layout

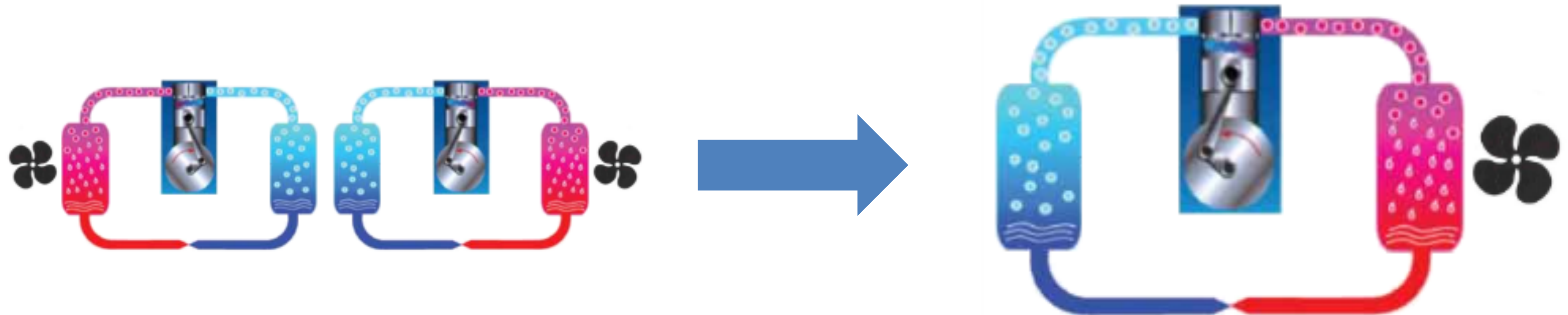
## Partners and technology base

- Partnership with refrigeration OEM's
- Collaboration with University
- Adoption of IoT technologies

Based on pulse EEV and an innovative algorithm for estimating the suction pressure

## Efficient cooler case

Flexible as double circuit with a single circuit



## Efficient cooler case

Flexible as double circuit with a single circuit

Self-contained cooler for Low Temp. and Normal Temp.

### One circuit only:

- 1 VSD compressors SECOP NLV12.6  
(504W @ LBP EN12900LBP)
- 1 condenser and 1 fan
- **Pulse EEV**

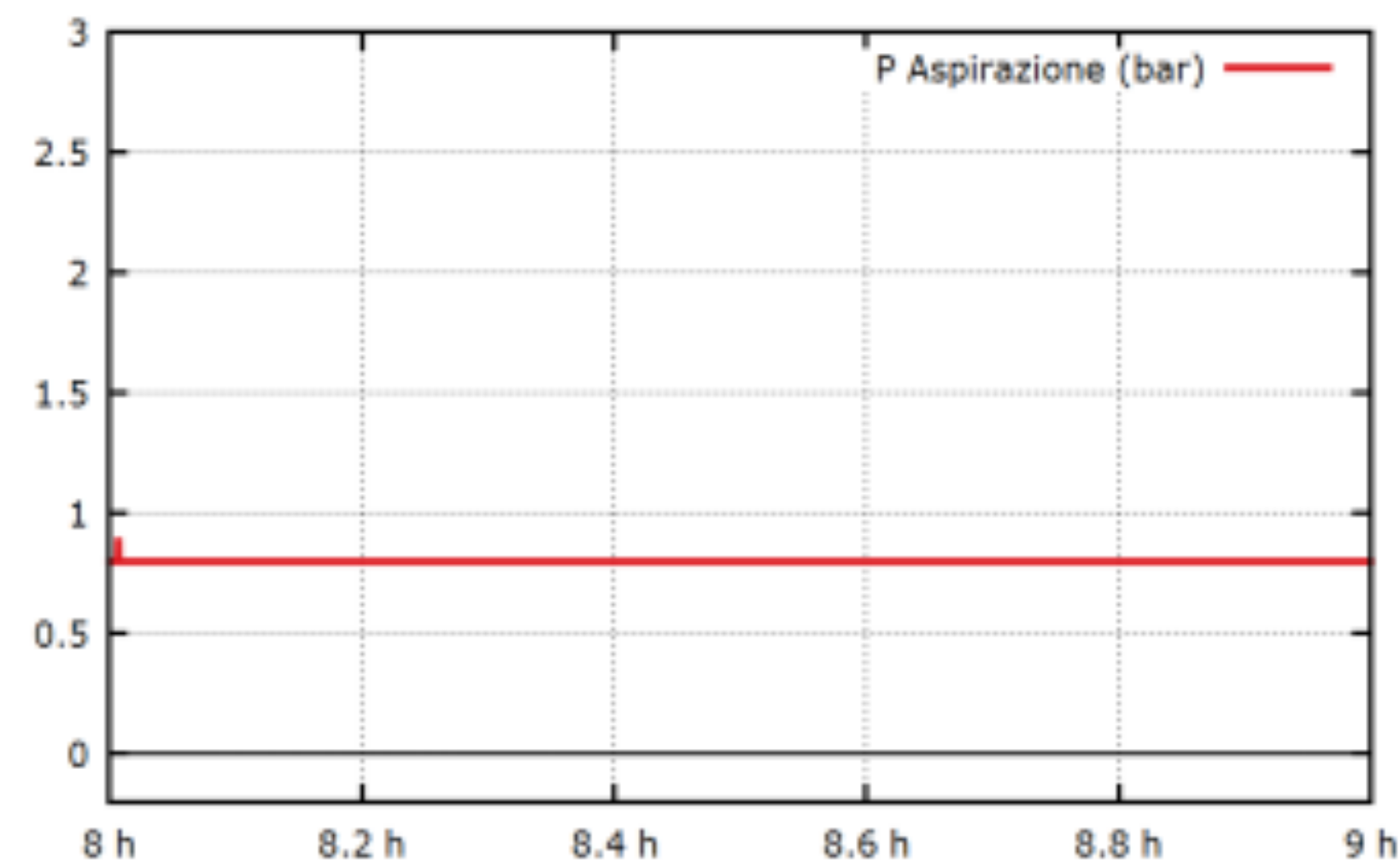
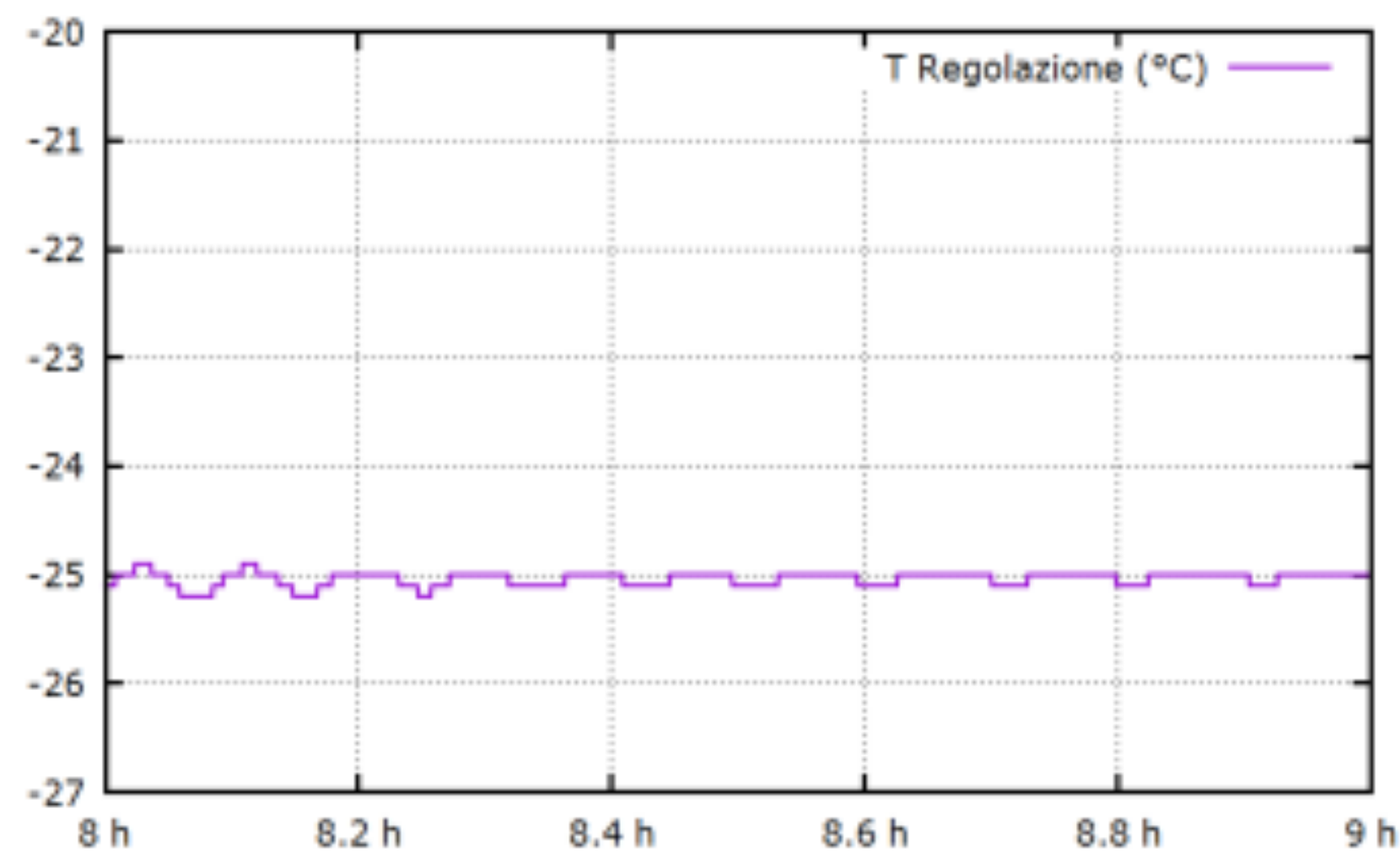
Refrigerant charge: 120gr R290

Probes: 4 NTC sensors (the pressure is estimated through



# Efficient cooler case – experimental results

## Suction pressure plot

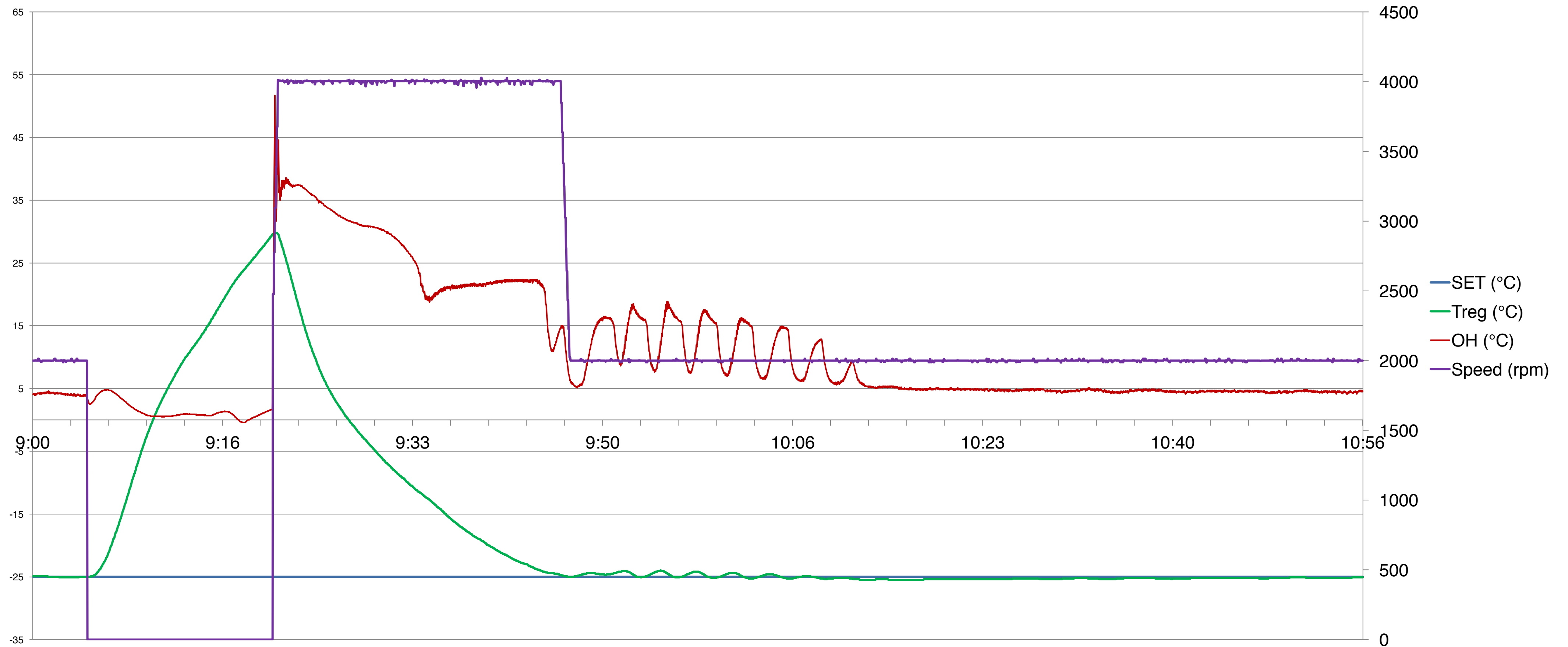


**Pulse EEV doesn't impact the Suction Pressure stability!**



# Efficient cooler case – experimental results

## Pull down transition



# Efficient cooler case – experimental results

	Standard	High efficiency
Build	2 compressors / 2 circuits / 2 capillary	1 VSD compressor / 1 circuit / 1 EEV
NT (0°C)	<b>241 W</b> 15 cycles/h	<b>150 W (-37%)</b> 10 cycles/h
LT (-25°C)	<b>455 W</b> 15 cycles/h	<b>310 W (-32%)</b> always on
R290	160 g	120 g

## Efficient cooler case – work in progress

- We are extending the case to alternative constructions.
- In particular we are testing it in a low-temp vertical glass-door cooler.
- The challenge stays in the small evaporator.

## Efficient cooler case

### Conclusions

- Significantly efficient
- Lower refrigerant charge
- No pressure sensors
- Simple and reliable pulse EEV
- Quicker pull down (after defrost or at power on)
- Shorter Bill of Material – less expensive equipment construction

## Efficient cooler case

### Ambitions

- Further improve efficiency
- Further ease commissioning/tuning
- Adopt same strategy on different equipment constructions
- Work more with compressor OEM's for more integrated solutions
- Optimize defrosting management



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**Thank you very much!**

