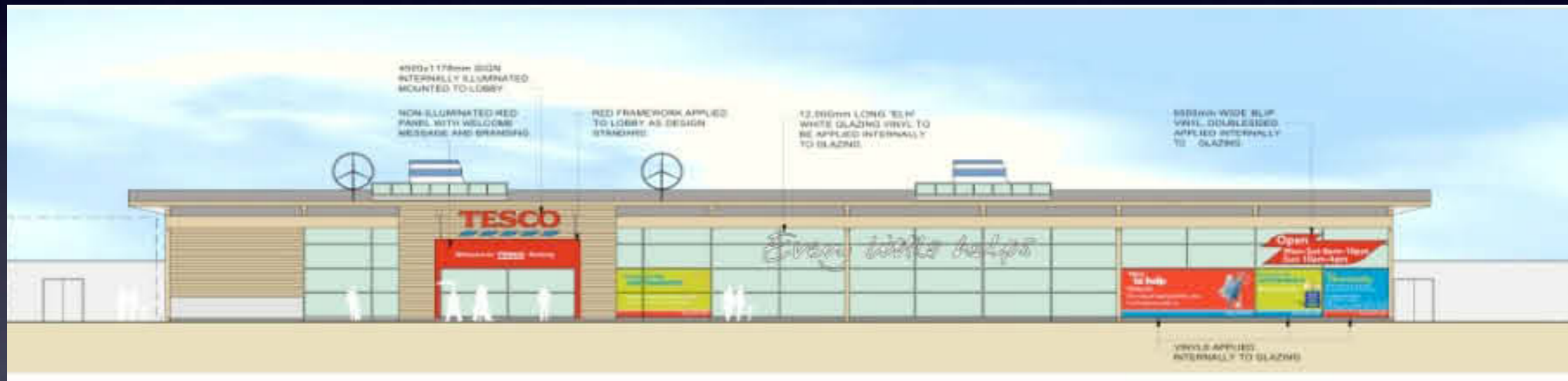


# Building Services for Low Carbon Supermarkets



# Presentation Format

Fabric and Mixed Mode

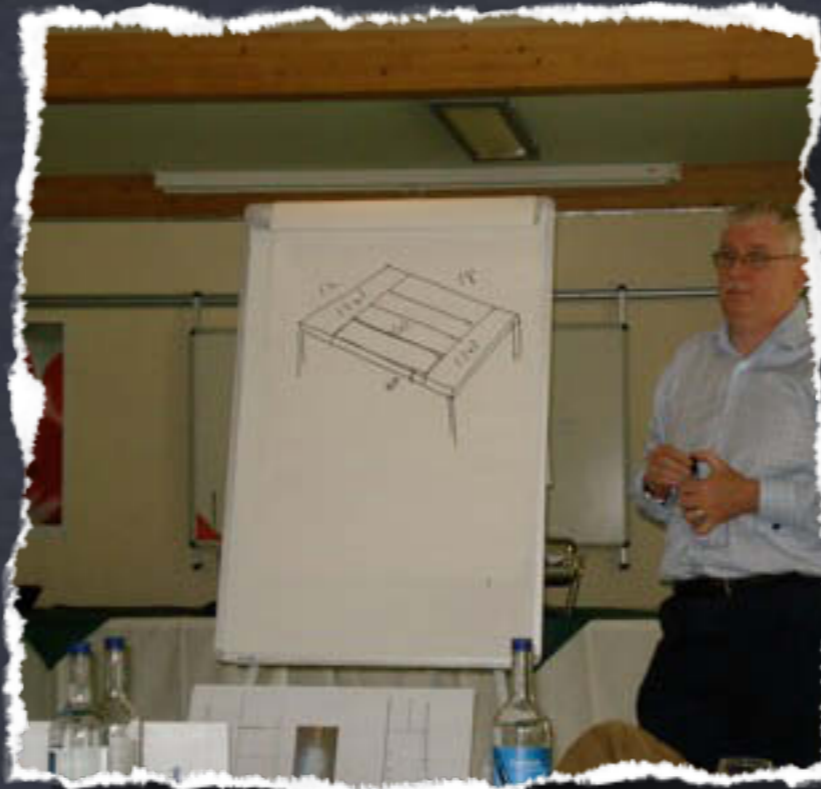
Lighting

CCHP

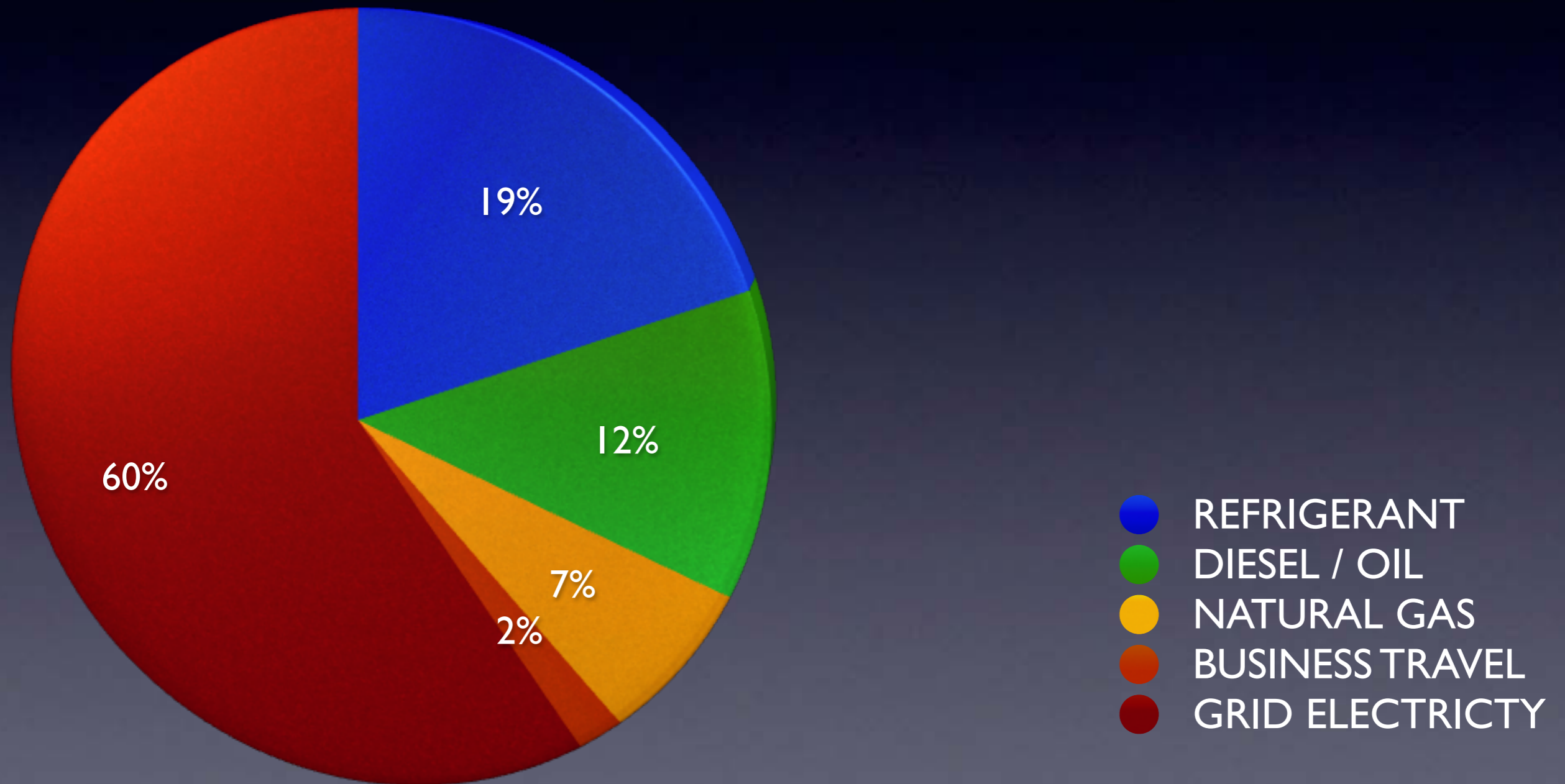
Refrigeration

Conclusions

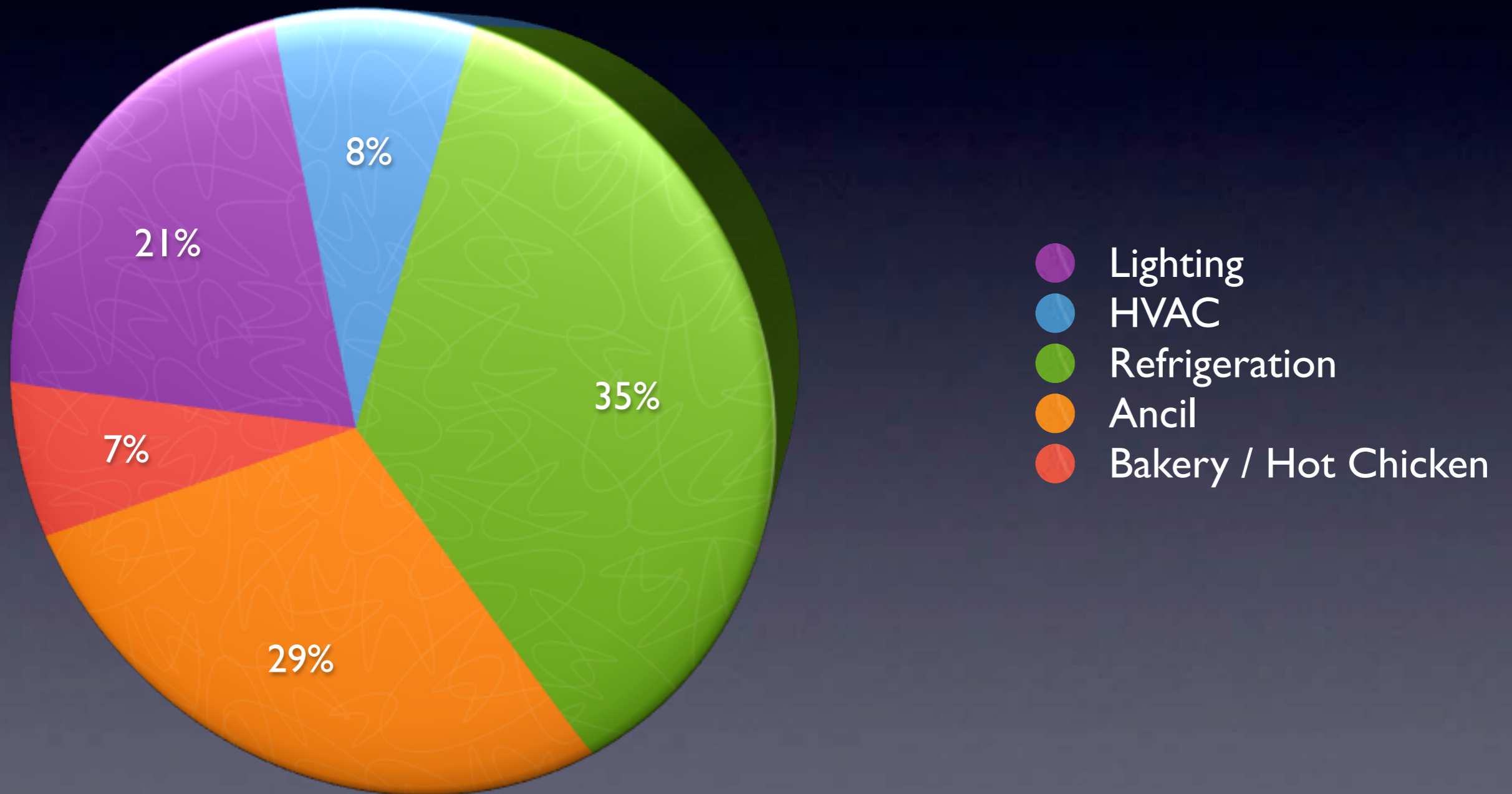
# BACKGROUND TO STORE FORMAT CHANGE



# Measured Carbon Footprint

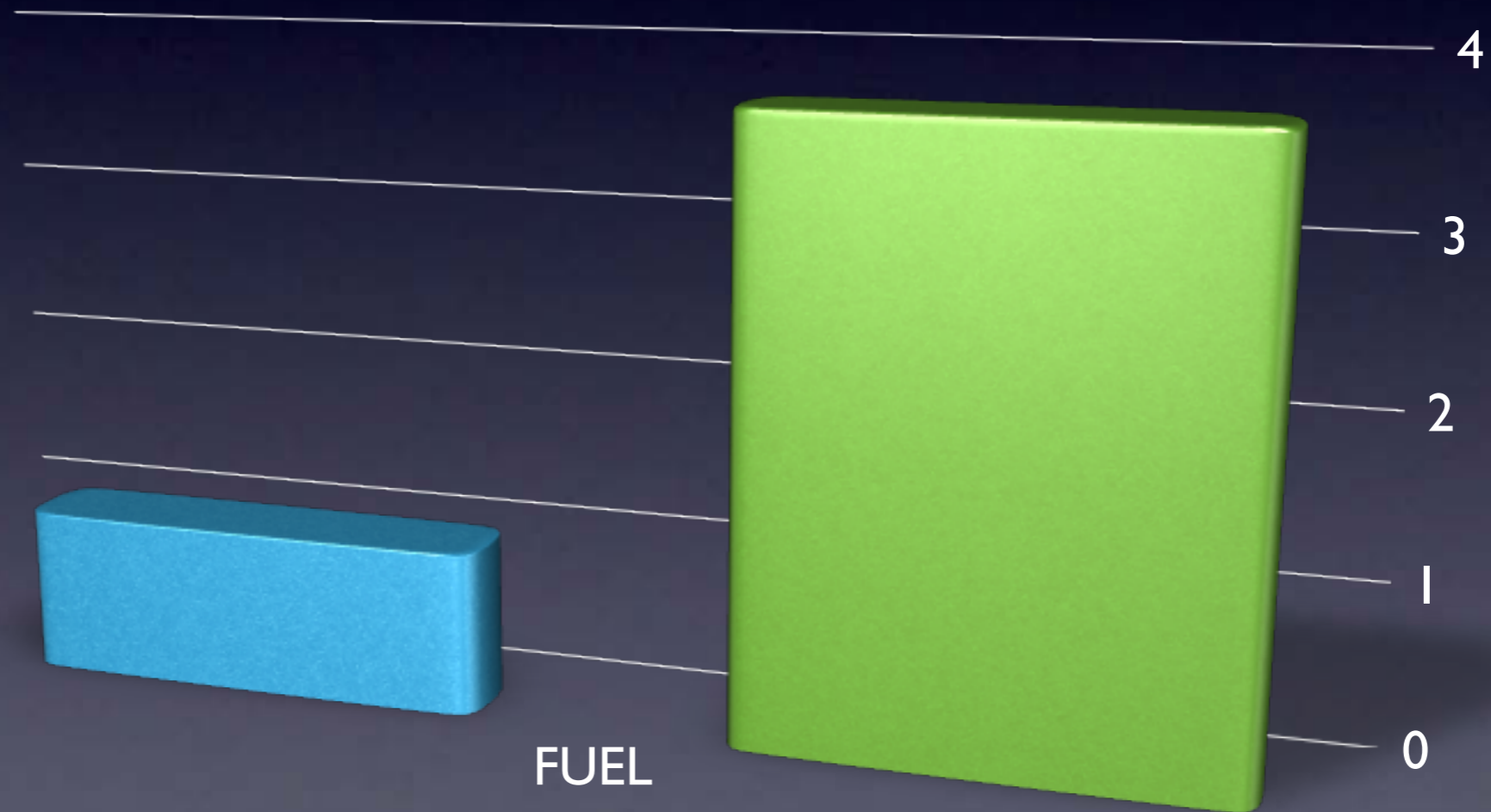


# Typical Store Energy Breakdown



# Fuel Breakdown Ratio

■ Gas      ■ Elec

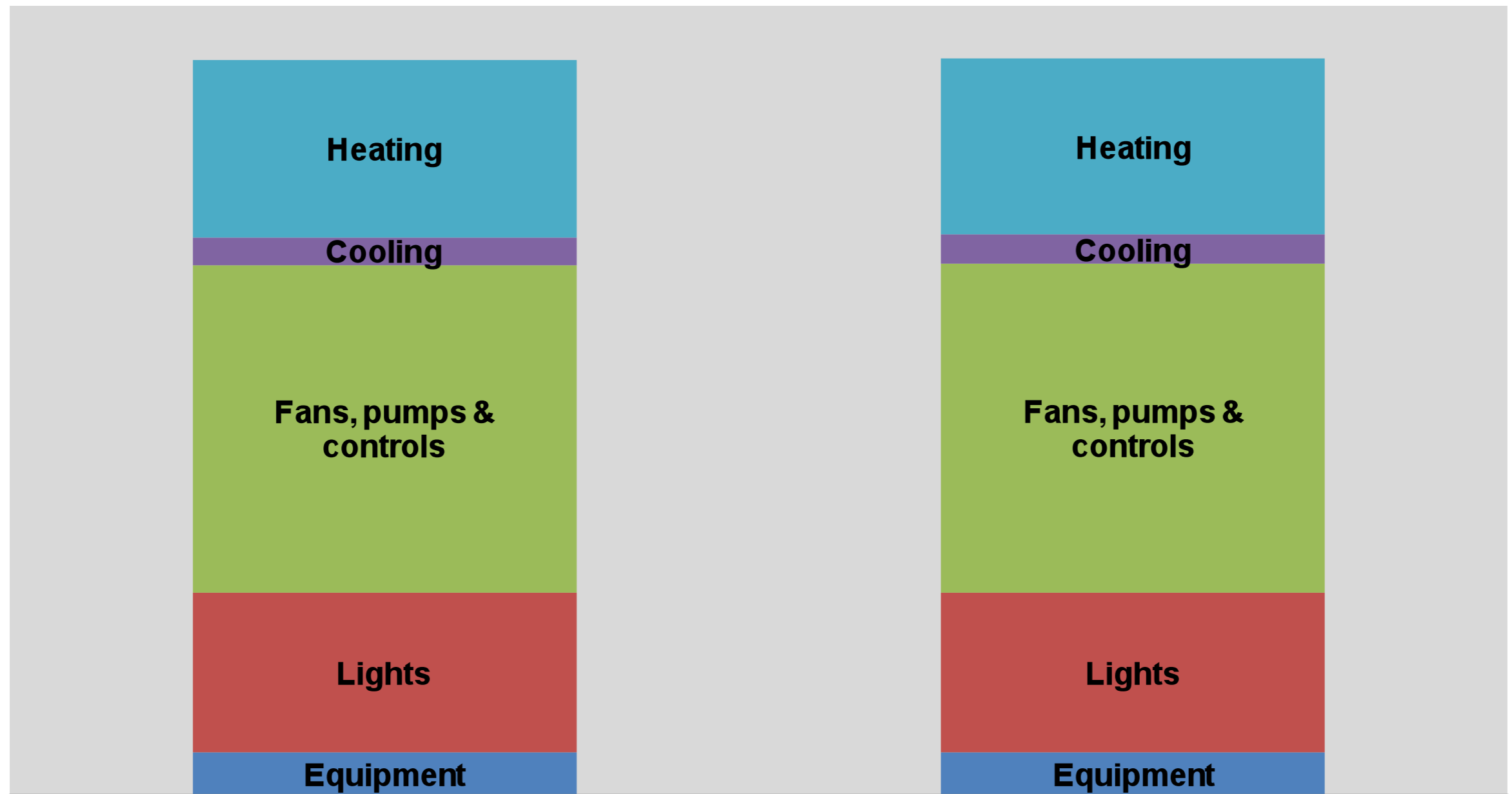


# Fabric and Mixed Mode



**Total 3,725MWh p.a.**

**Total 3,733MWh p.a.**

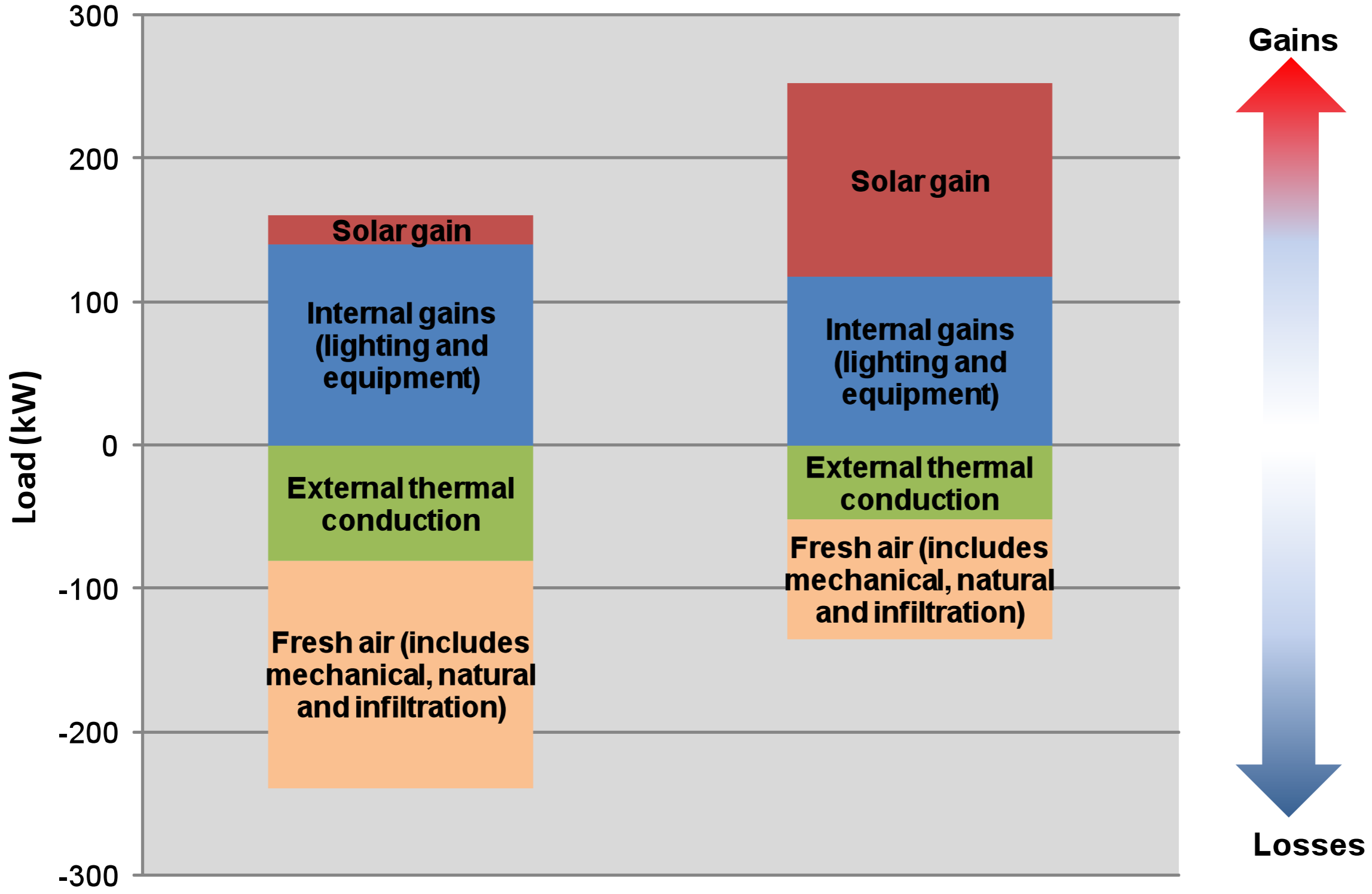


***Base case***

***Improved U-values***

*Example Winter Day*

*Example Summer Day*

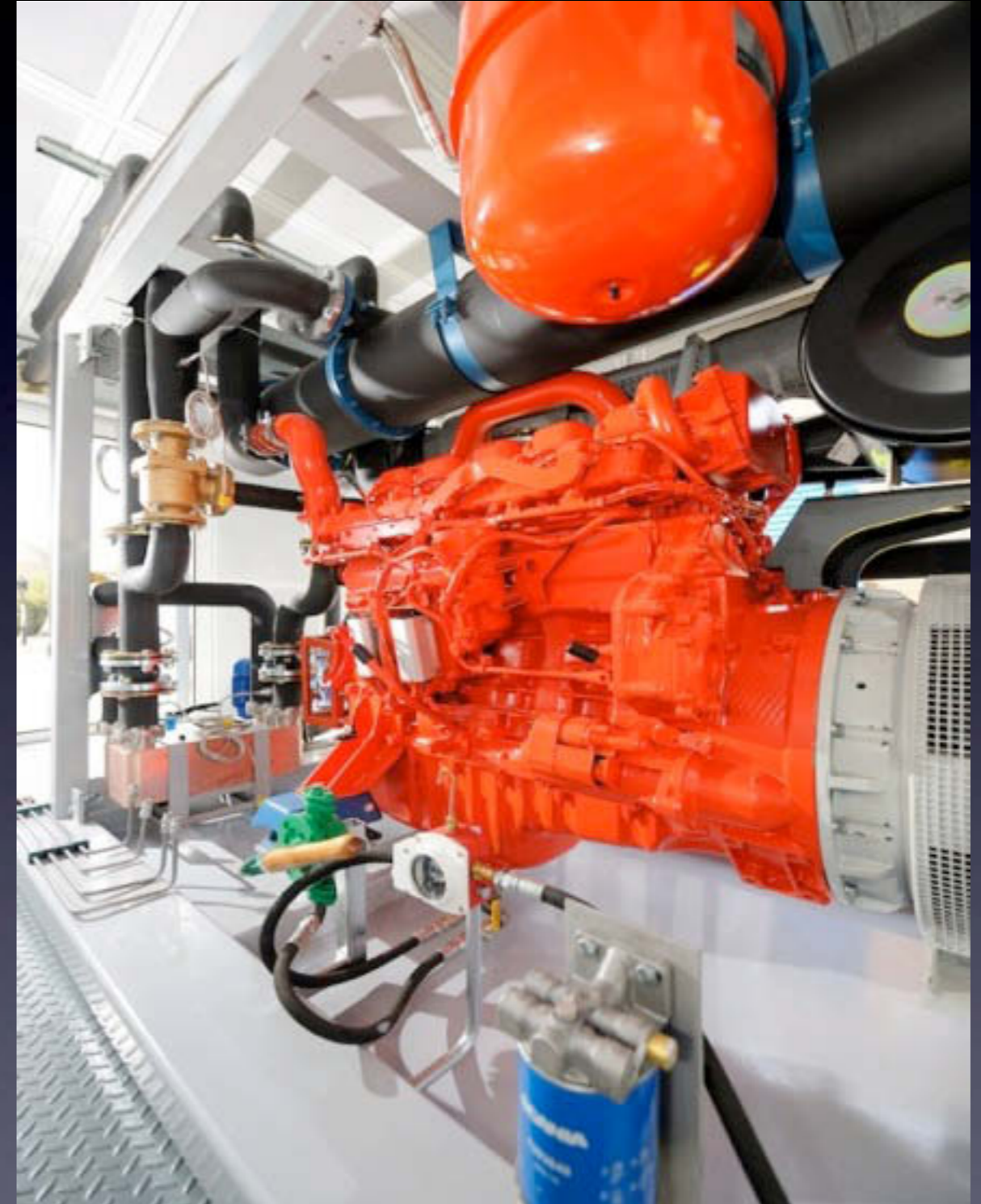




CCHP

# CHP

- CHP 200 kW<sub>e</sub>
- 50% of Store's Electricity
- 80% of Store's Heat
- Ofgem registration and ROC accreditation
- First liquid bio mass CHP
- Provides electricity, heat and HVAC cooling (via absorption chiller) from a single fuel source
- Interface with building BMS for thermal control system

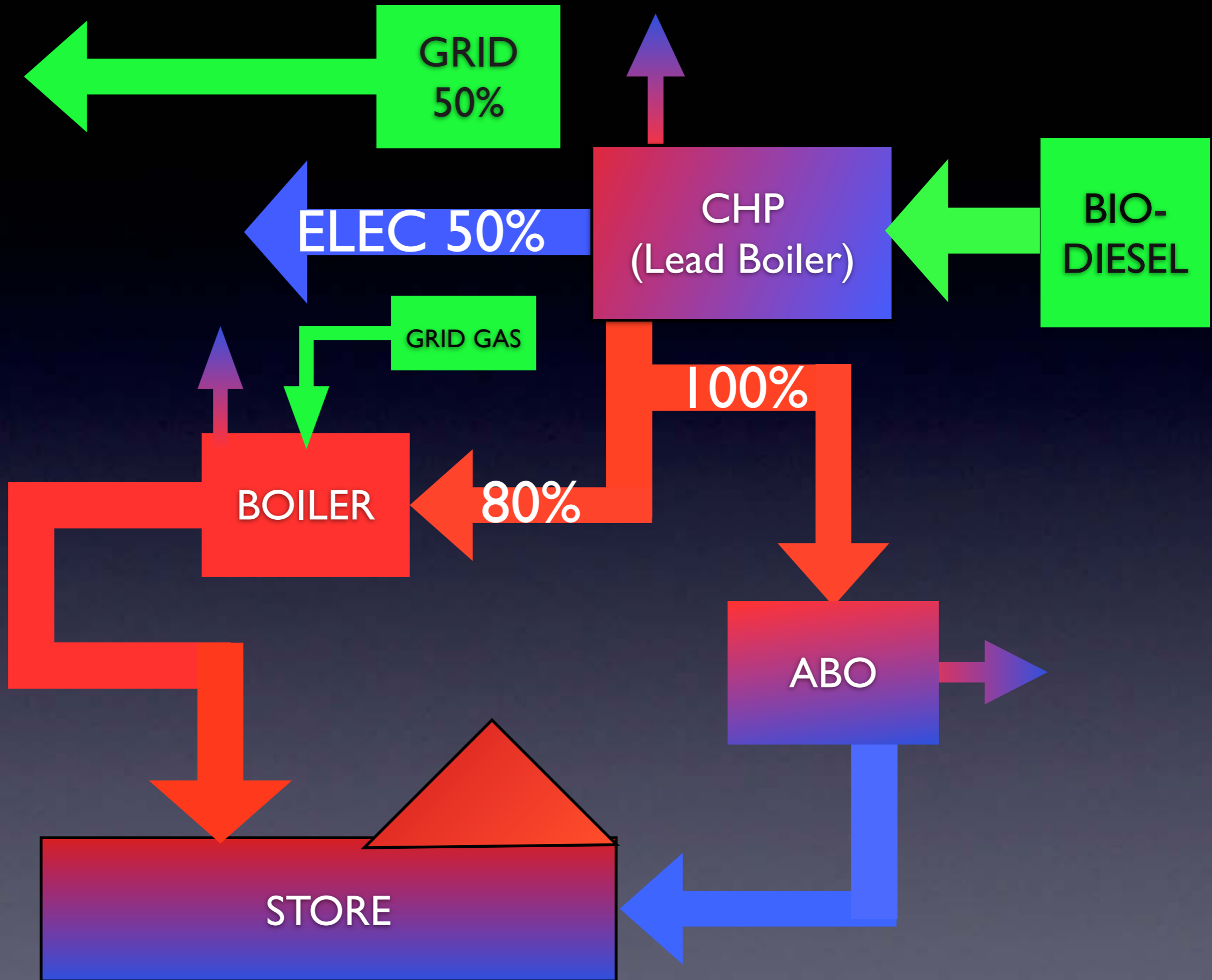




# ABSORPTION CHILLER

- Absorption Chiller
- 180kW
- 100% of Chilling
- (but with back)







# Lighting



SALES FLOOR, ENTRANCE LOBBY,  
POWER AISLE, CENTRAL AISLE,  
REAR AISLE



DELI LIGHTING



DELI  
900 lux



OPTICIAN LIGHTING



OPTICIAN  
1100 lux

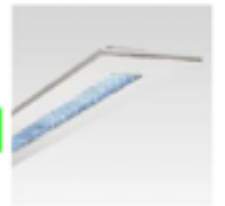


SALES FLOOR  
900lx

CLOTHING  
1100 lux

BWS  
1100lux

PRODUCE  
1100lux



BLUE SKY LIGHTING



CUSTOMER CAFÉ PREP  
500lx

FRONT 2 ROWS ADJACENT FULLY  
GLAZED STORE FRONT  
Daylight linked set to 900lx

LOBBY  
500lx



CUSTOMER TOILETS  
500lx

TOILET BABY CHANGE  
500lx

All lux levels are minimum values across the sales floor.  
24 HR STORES BETWEEN 10pm-8am – 500lx – As main sales floor  
STORE CLOSED – 300lx – As main sales floor  
All louvers and cross blades to be mirrored types.

### TYPICAL STORE LIGHTING ARRANGEMENTS





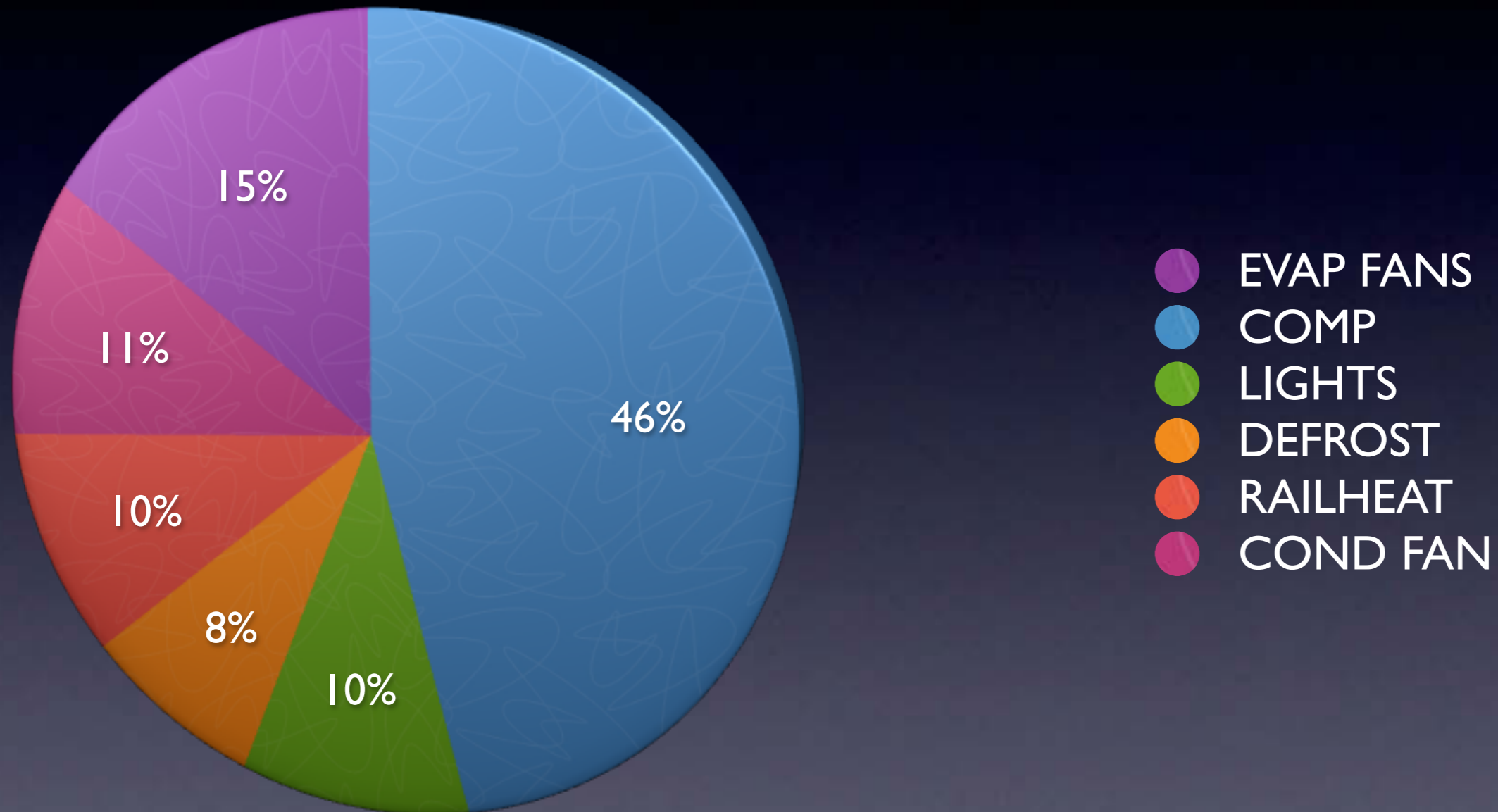
ROOF LIGHTS

FRONT  
ELEVATION

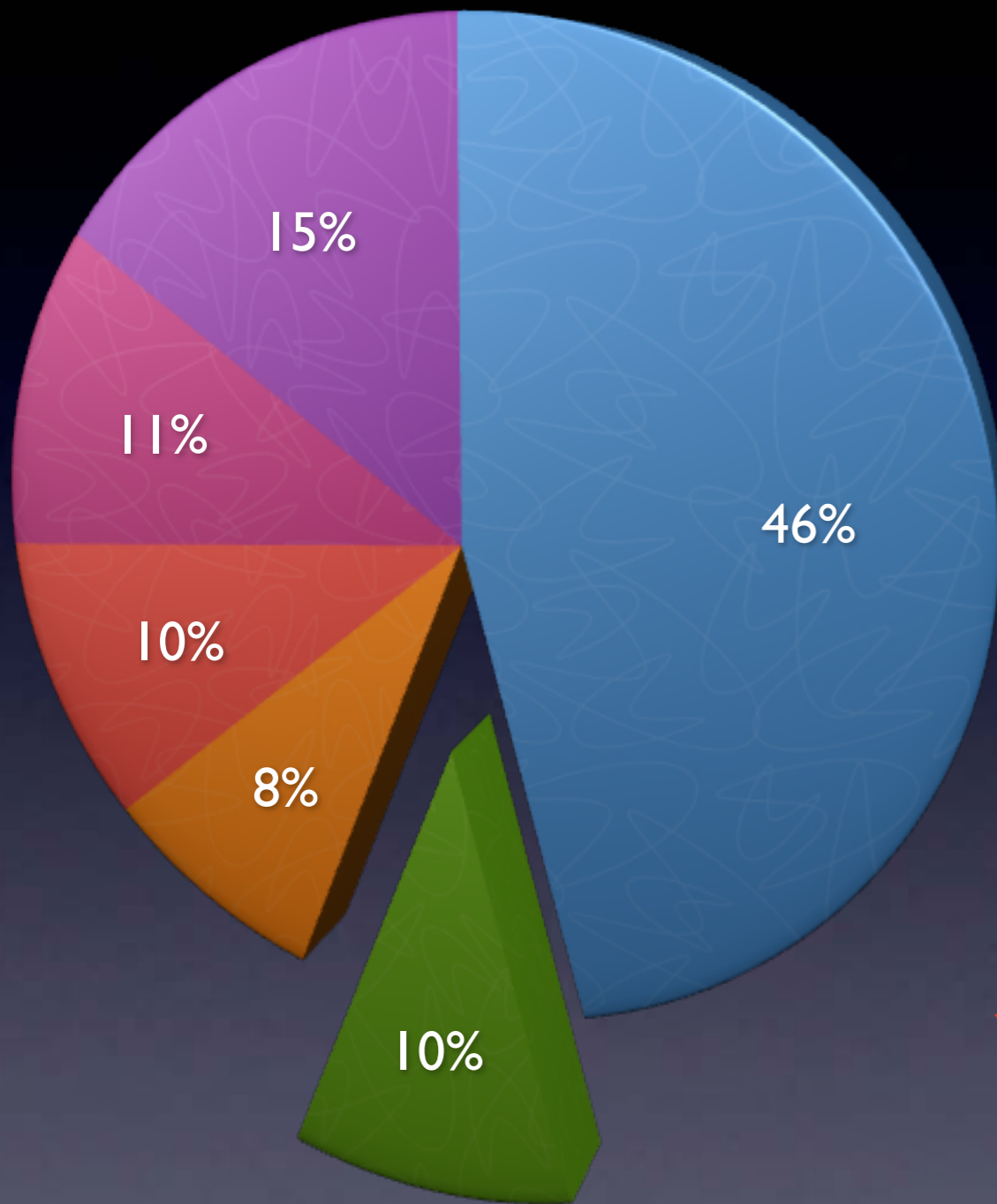


# Refrigeration

# Where energy is used

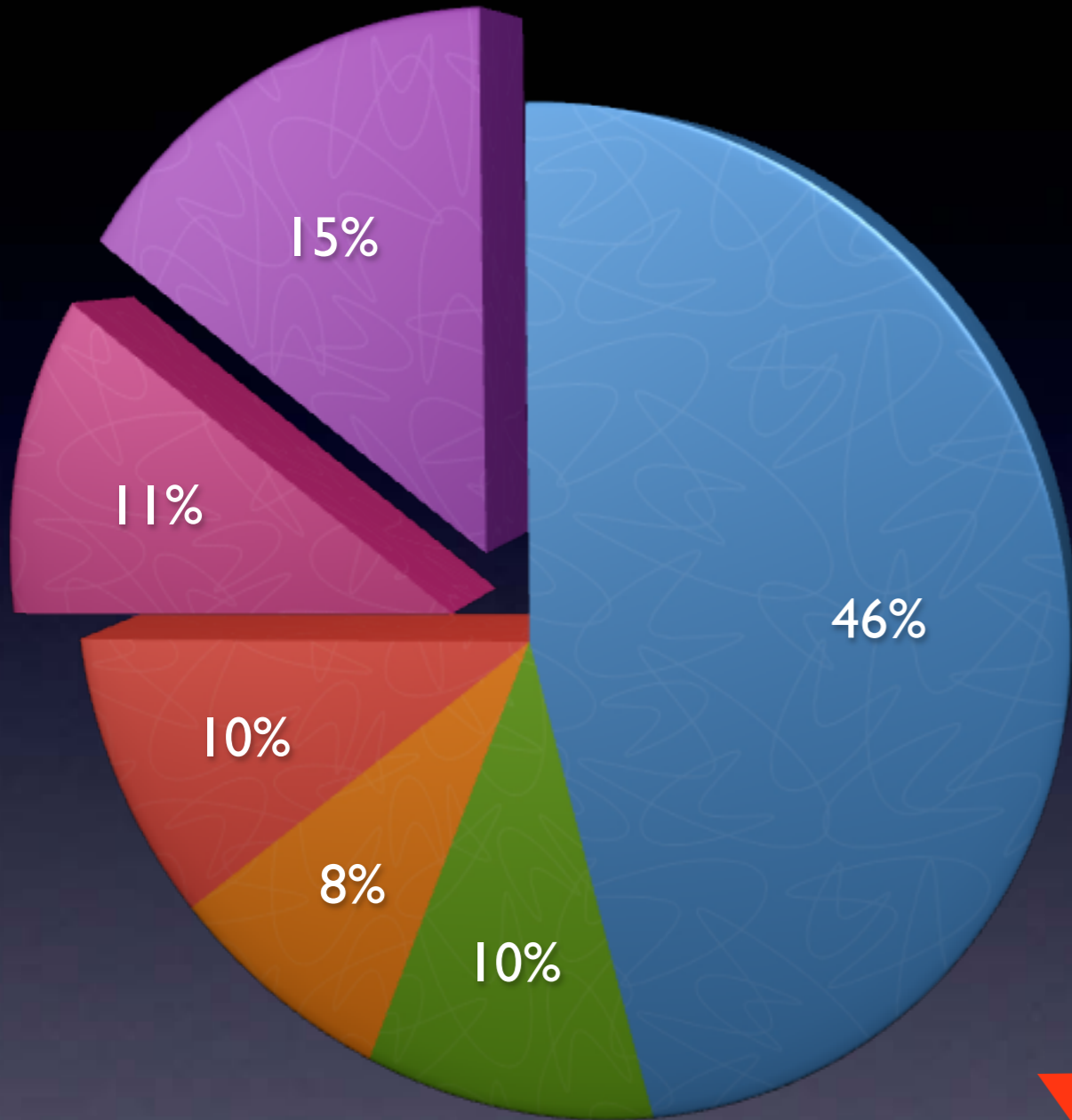


# Lighting Technology Improvements



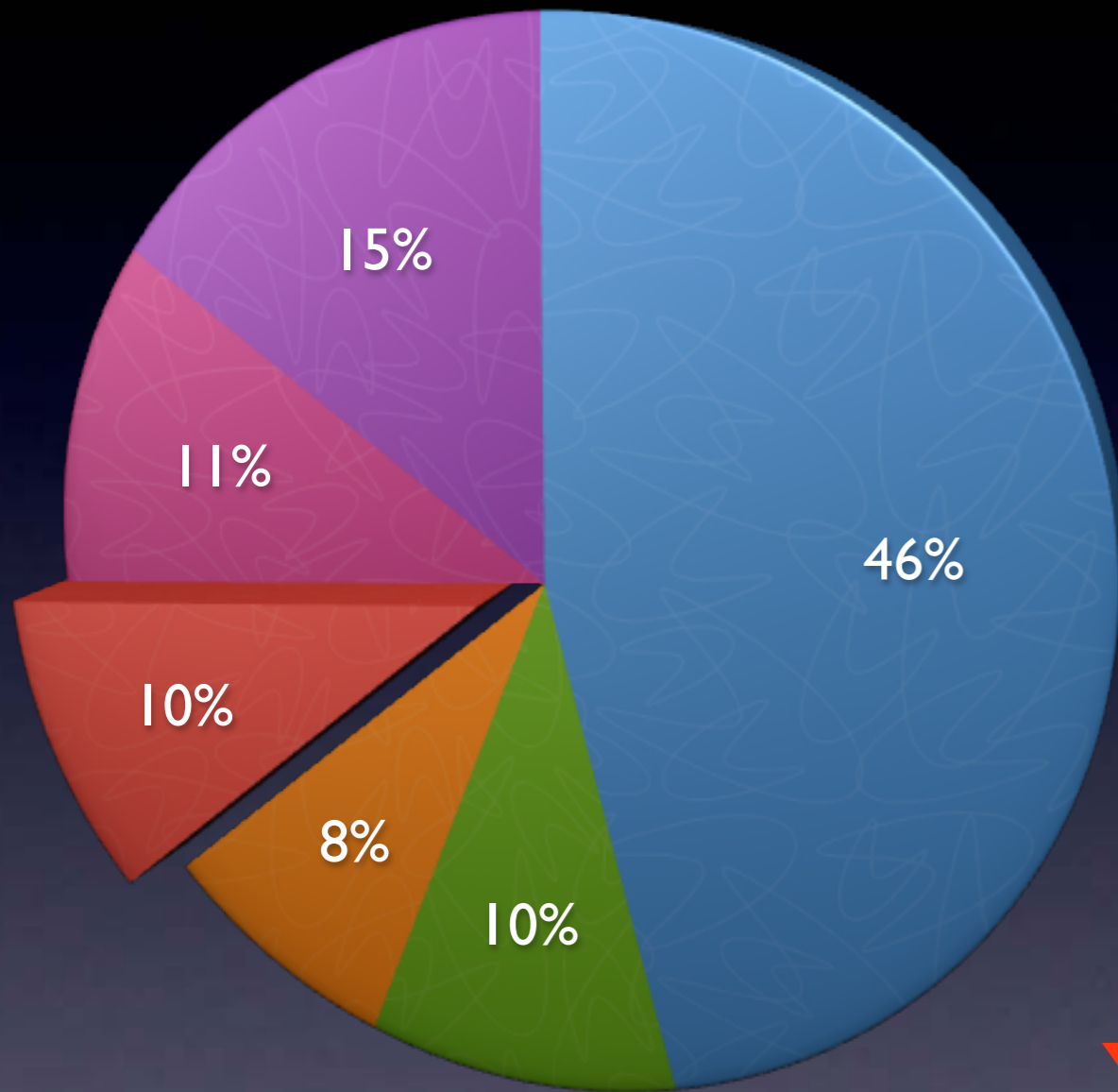
Circa Reduction of 45%

# Fan Motor Technology Improvements



Circa Reduction of 55%

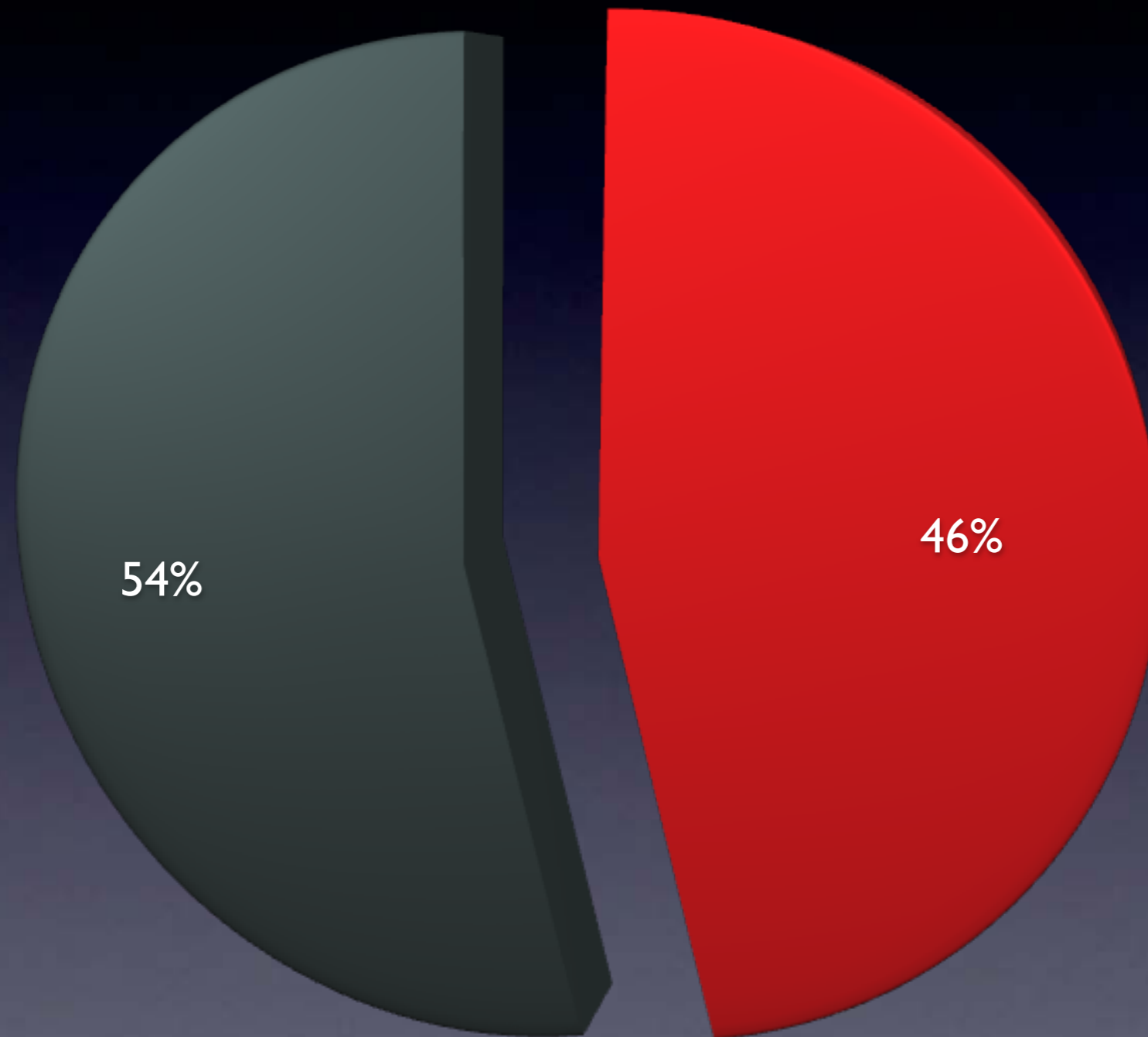
# Trim Heater Technology Improvements



Circa Reduction of 20%



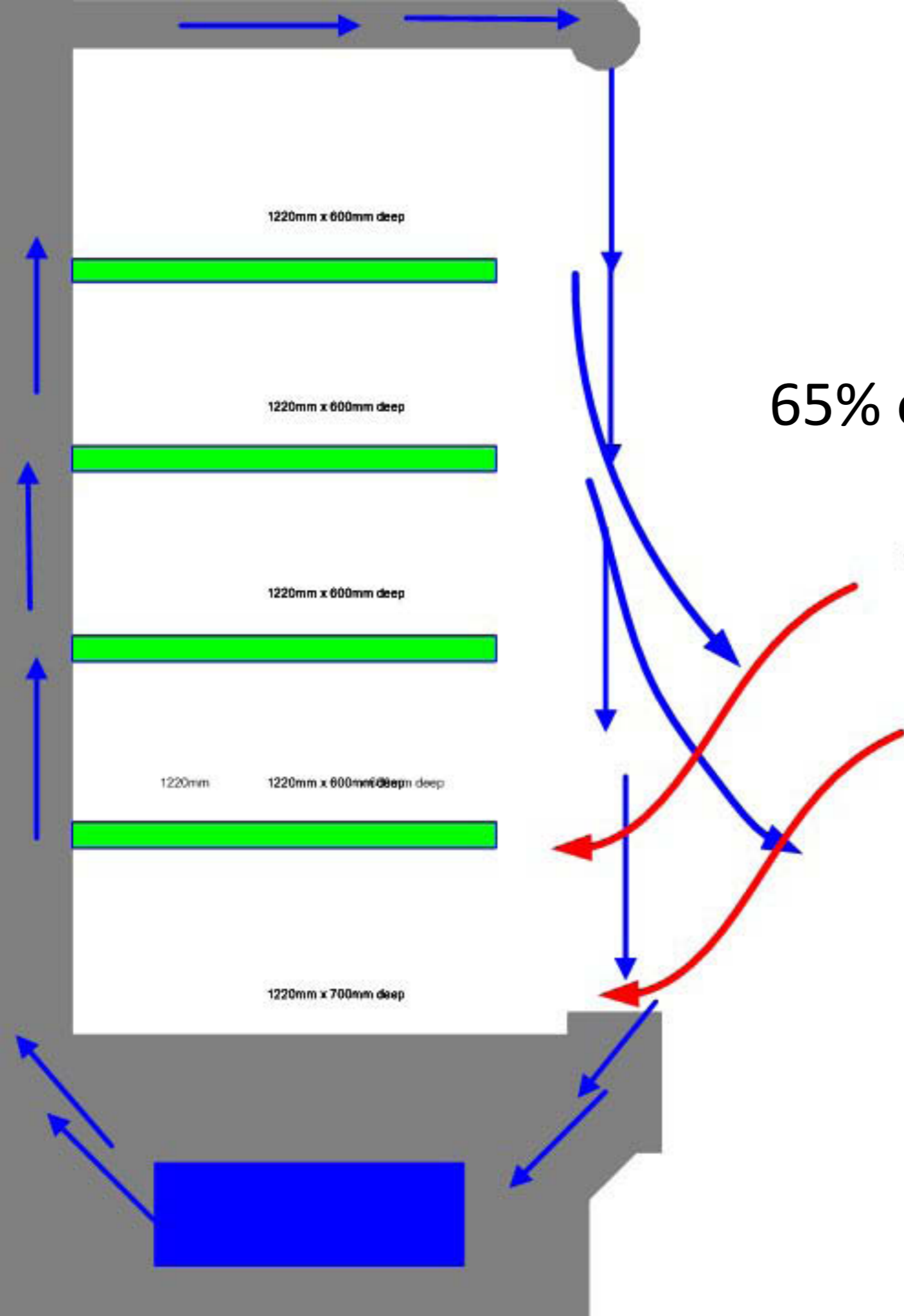
# Compressor Load Improvements



25°C 60% R.H.

65% of COMPRESSOR LOAD

WARM AIR



# Doors on Chill Cases



# Door on Chill Cases

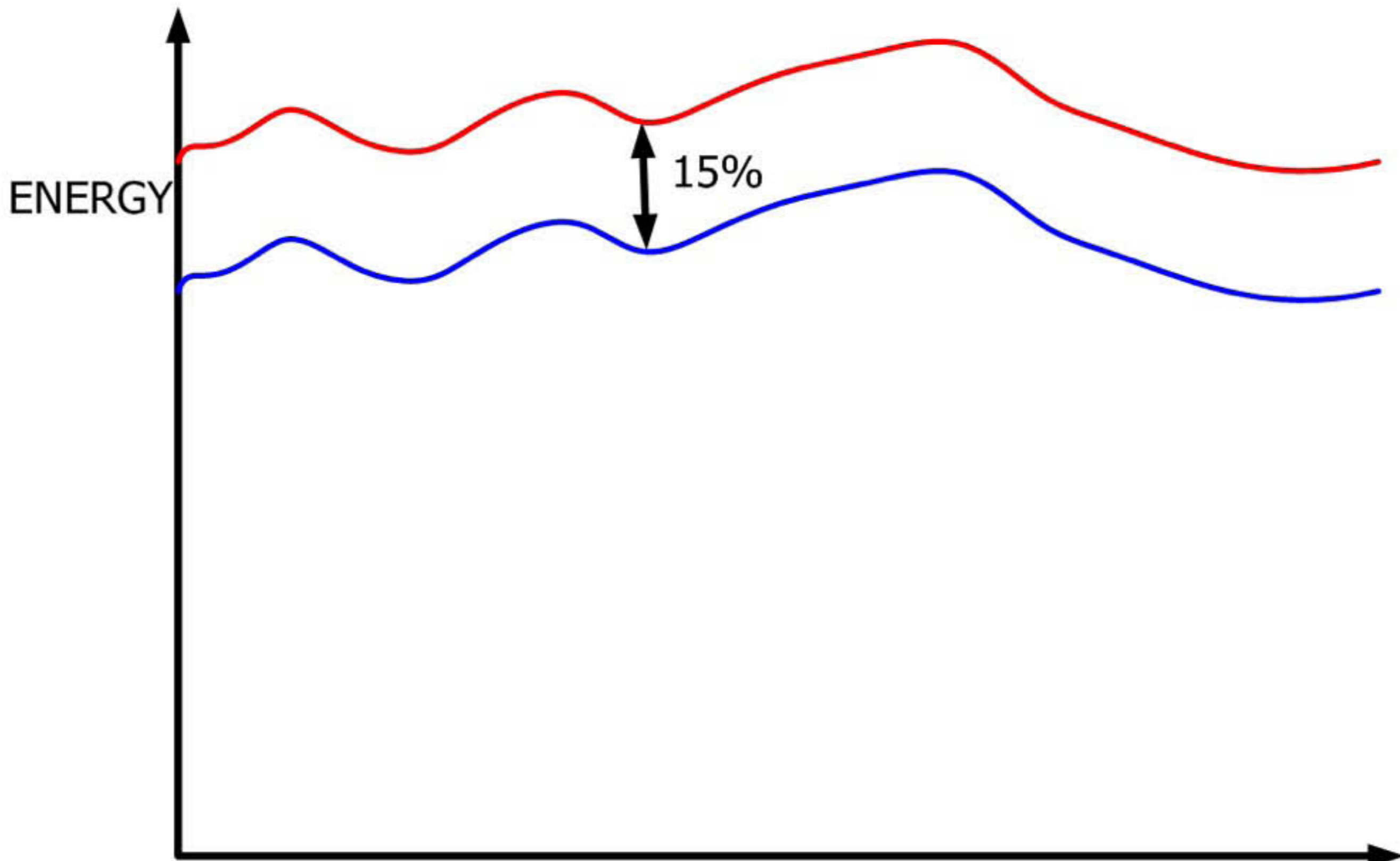
Savings from 30% to  
60% depending on  
Application  
This store 25%

# Control Optimization

- Set-Point Lock Down
- Floating Suction & Discharge
- Intelligent Defrost
- Lighting Control

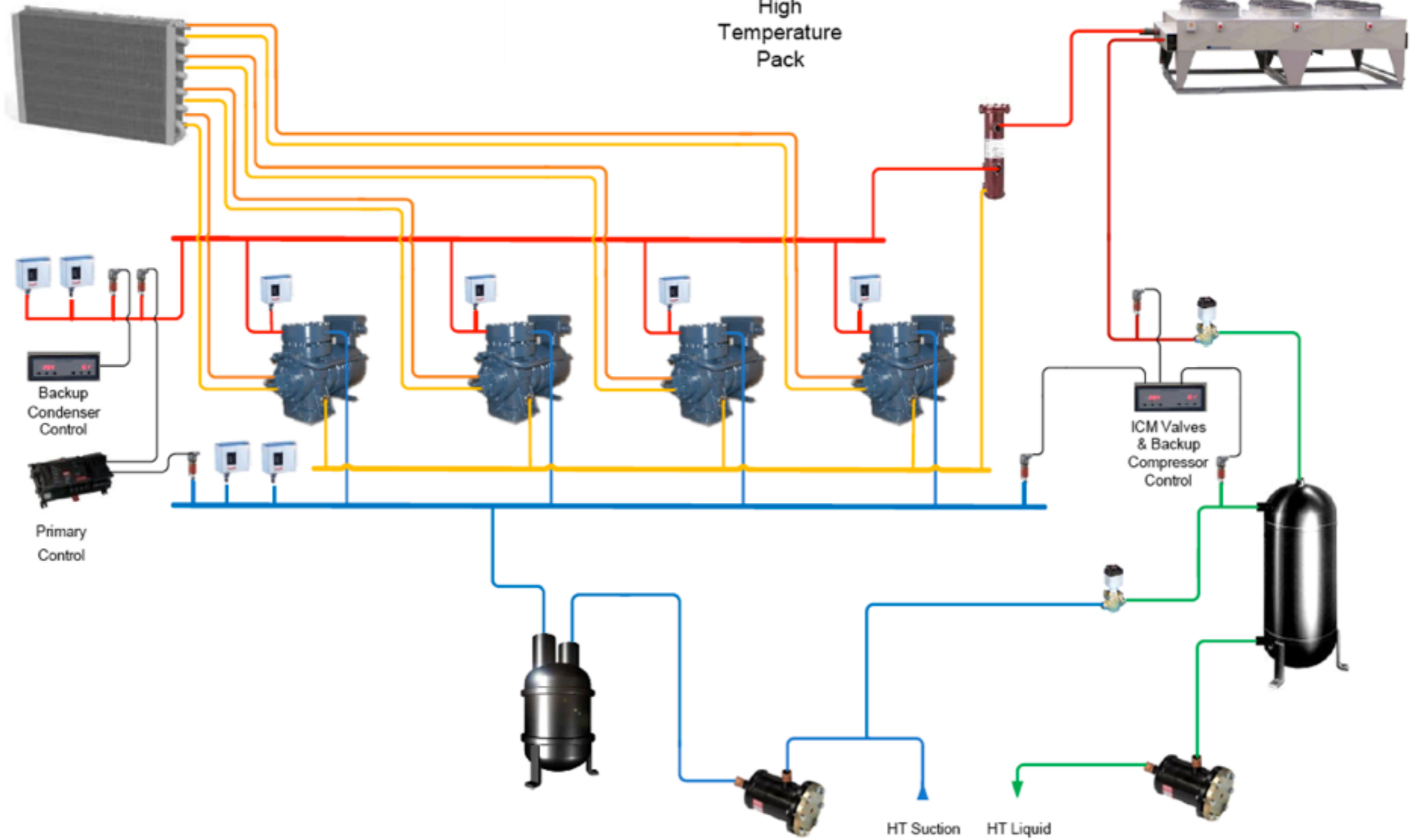


# Optimization

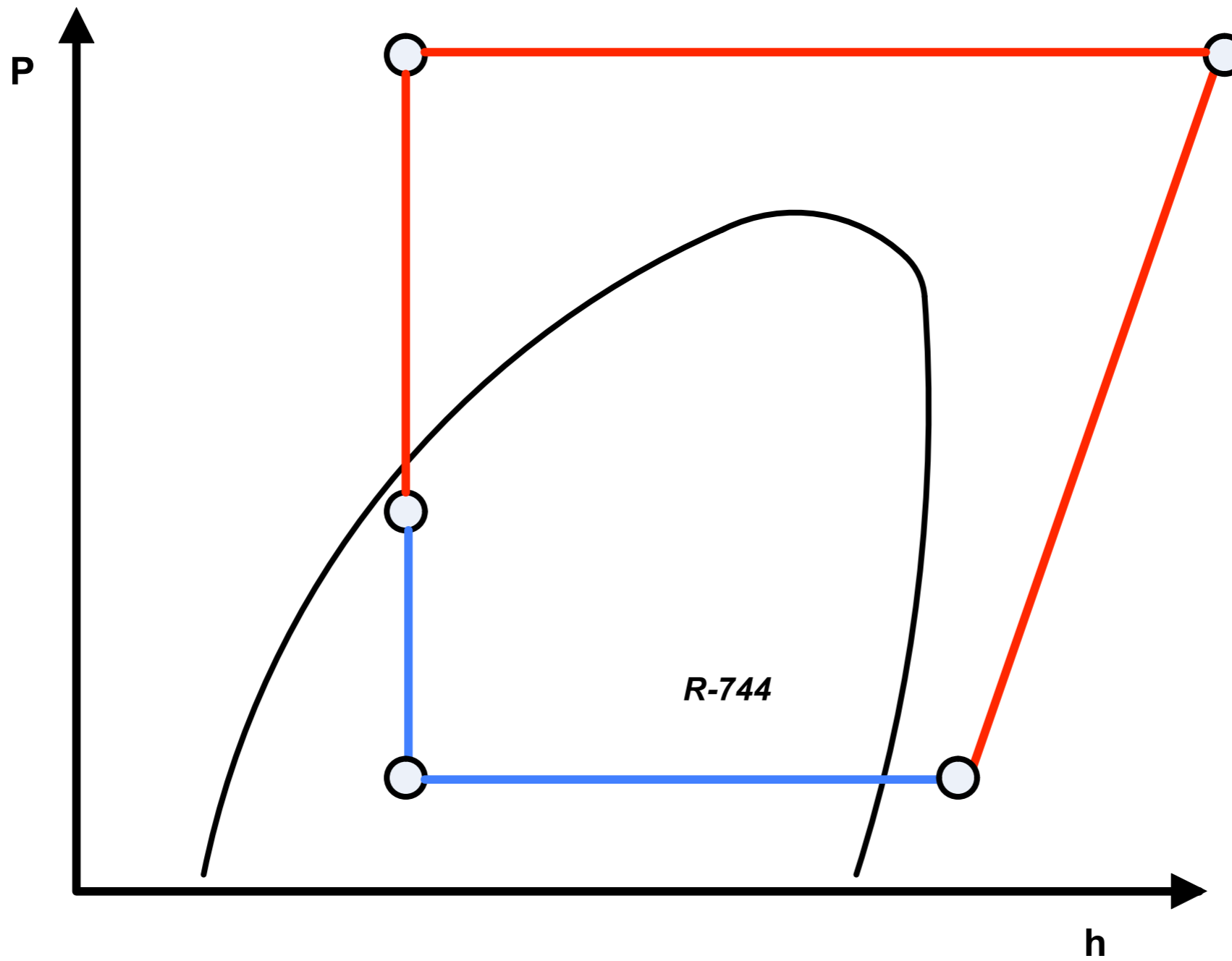


Tesco  
Cheetham Hill

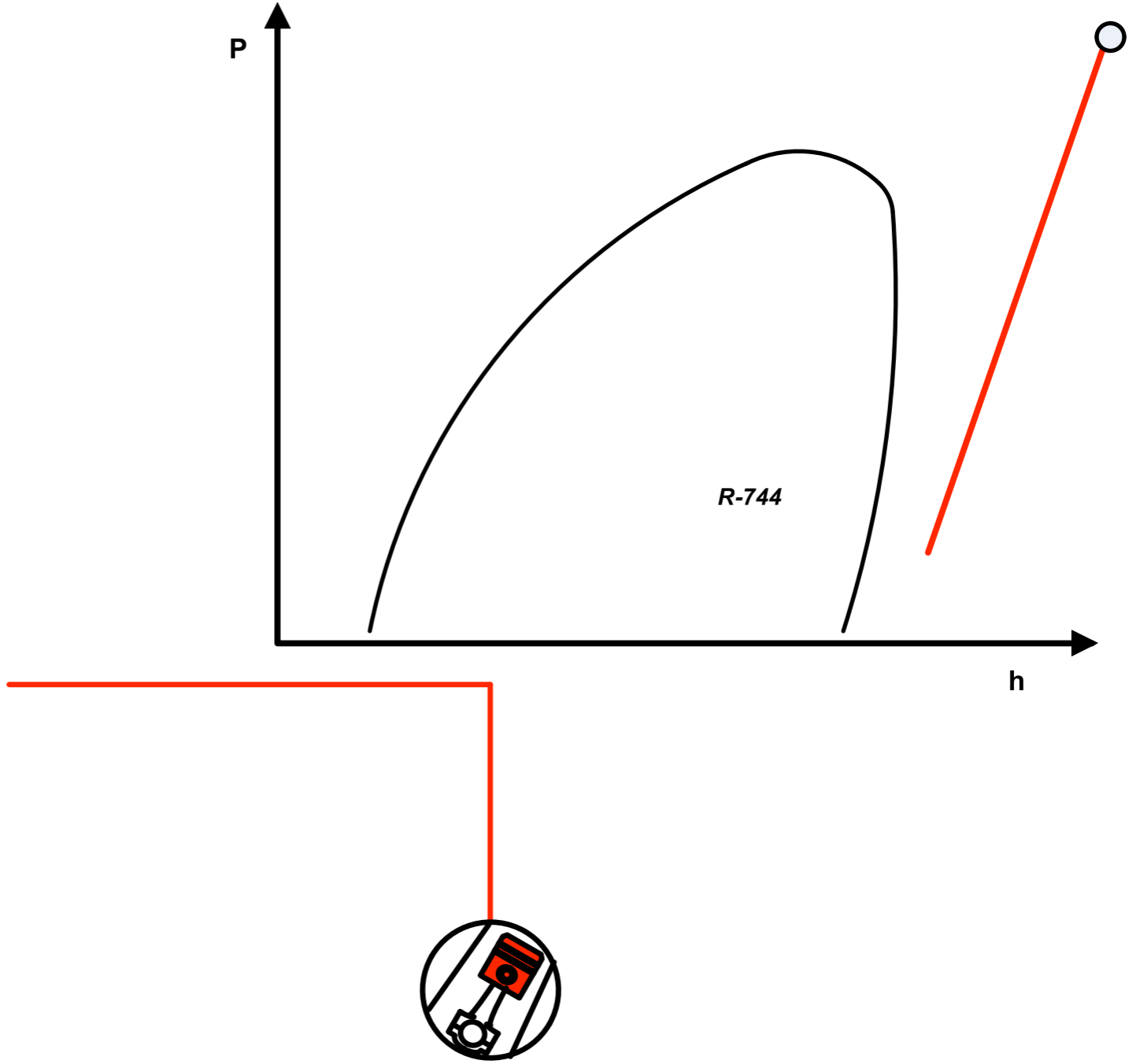
High  
Temperature  
Pack

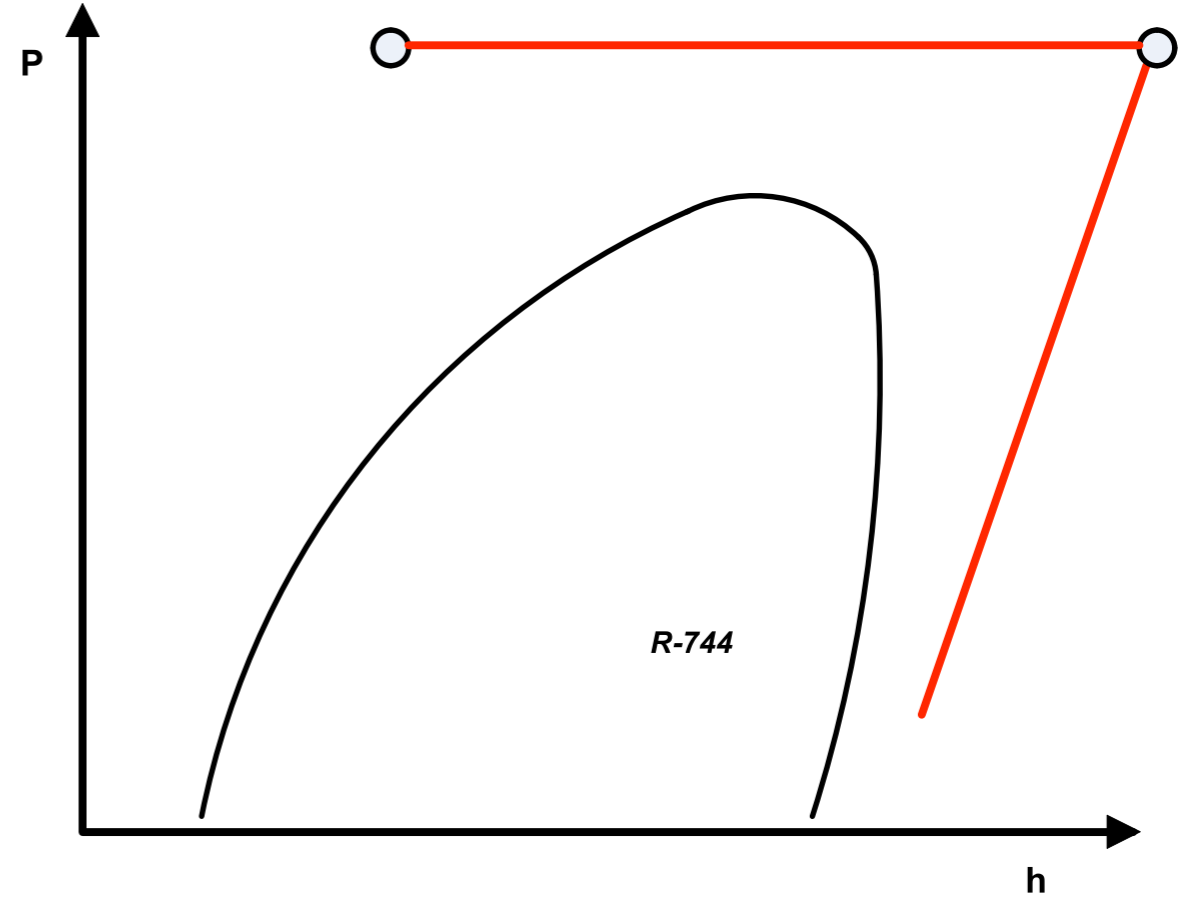
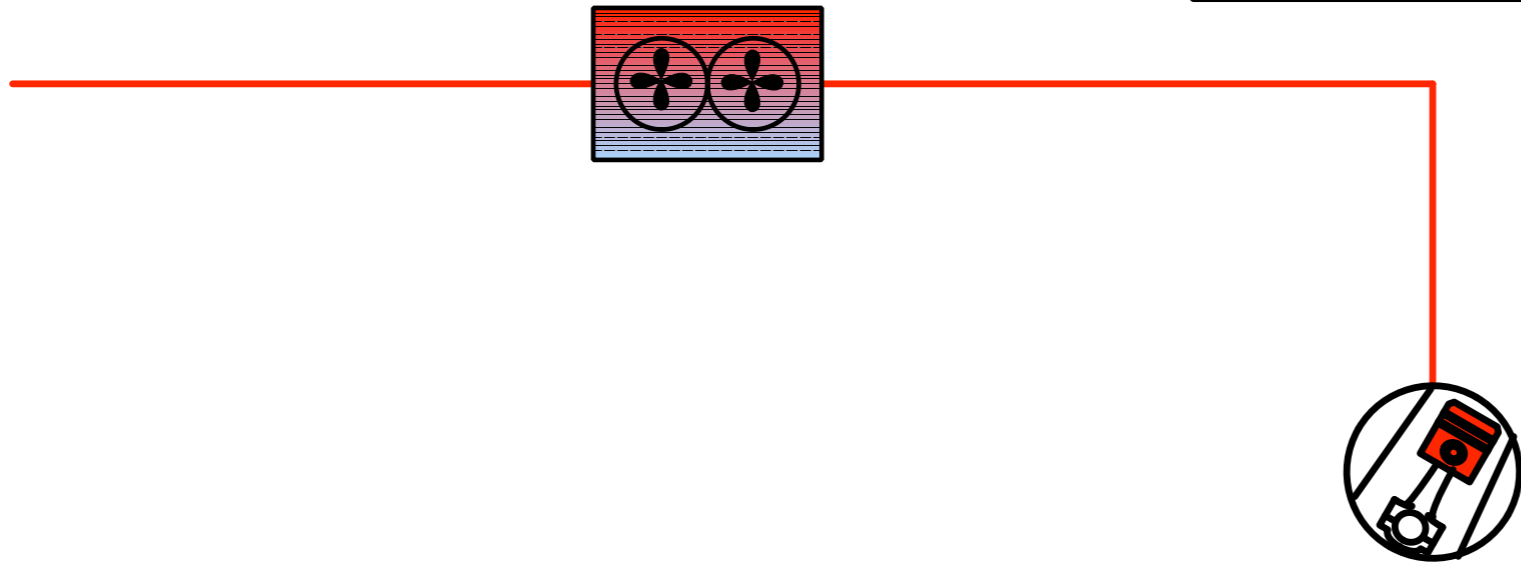


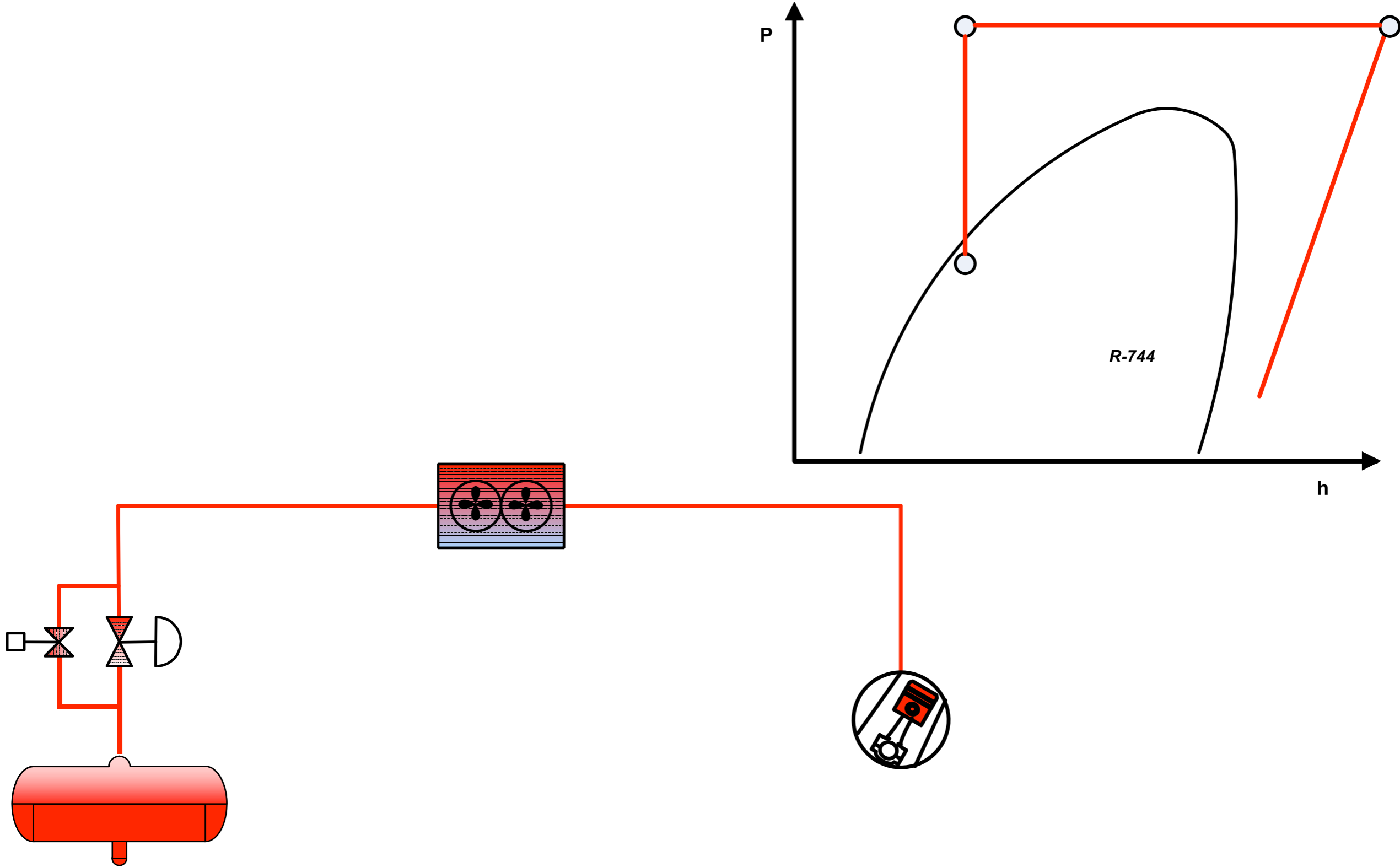
# Transcritical (31.1 °C)

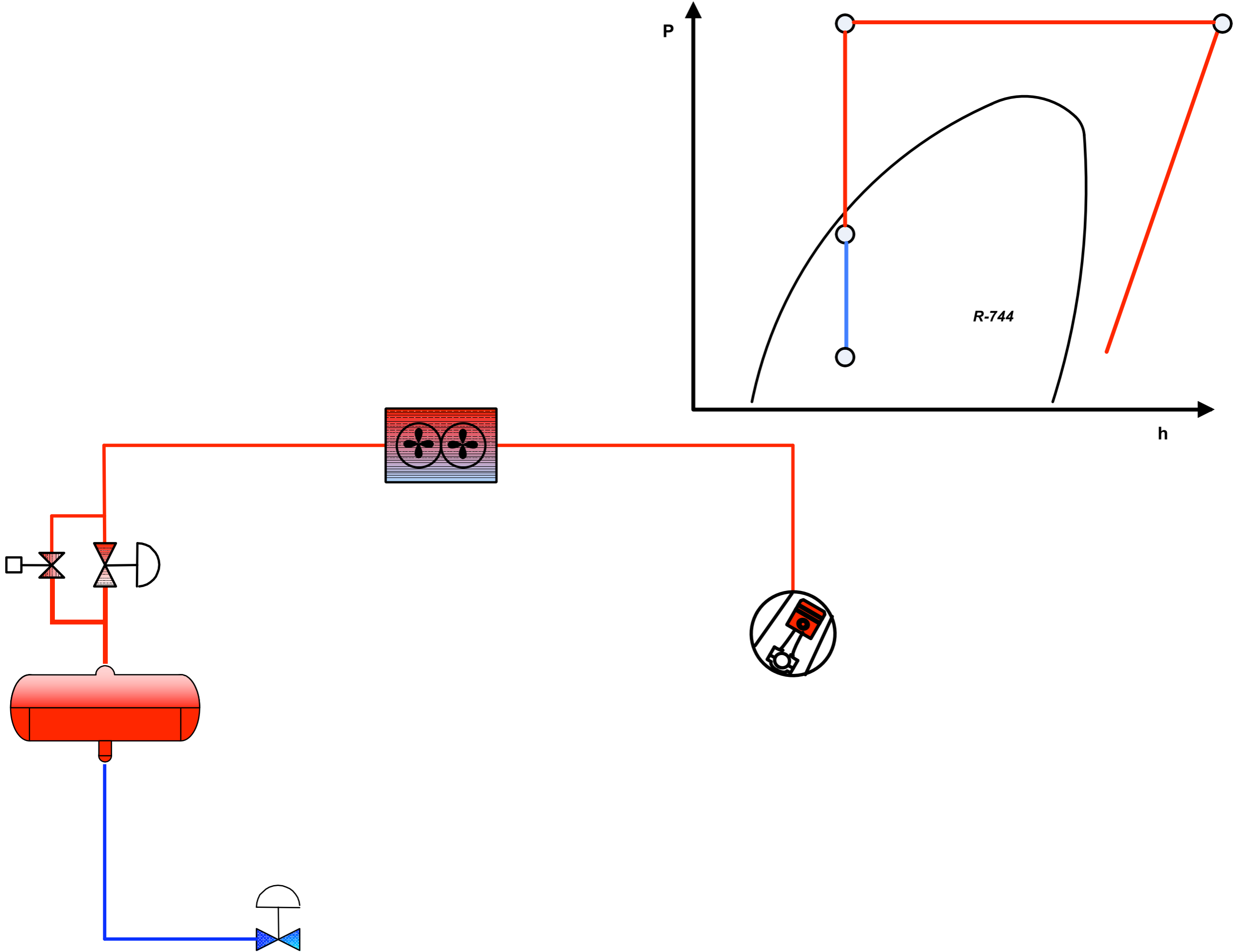


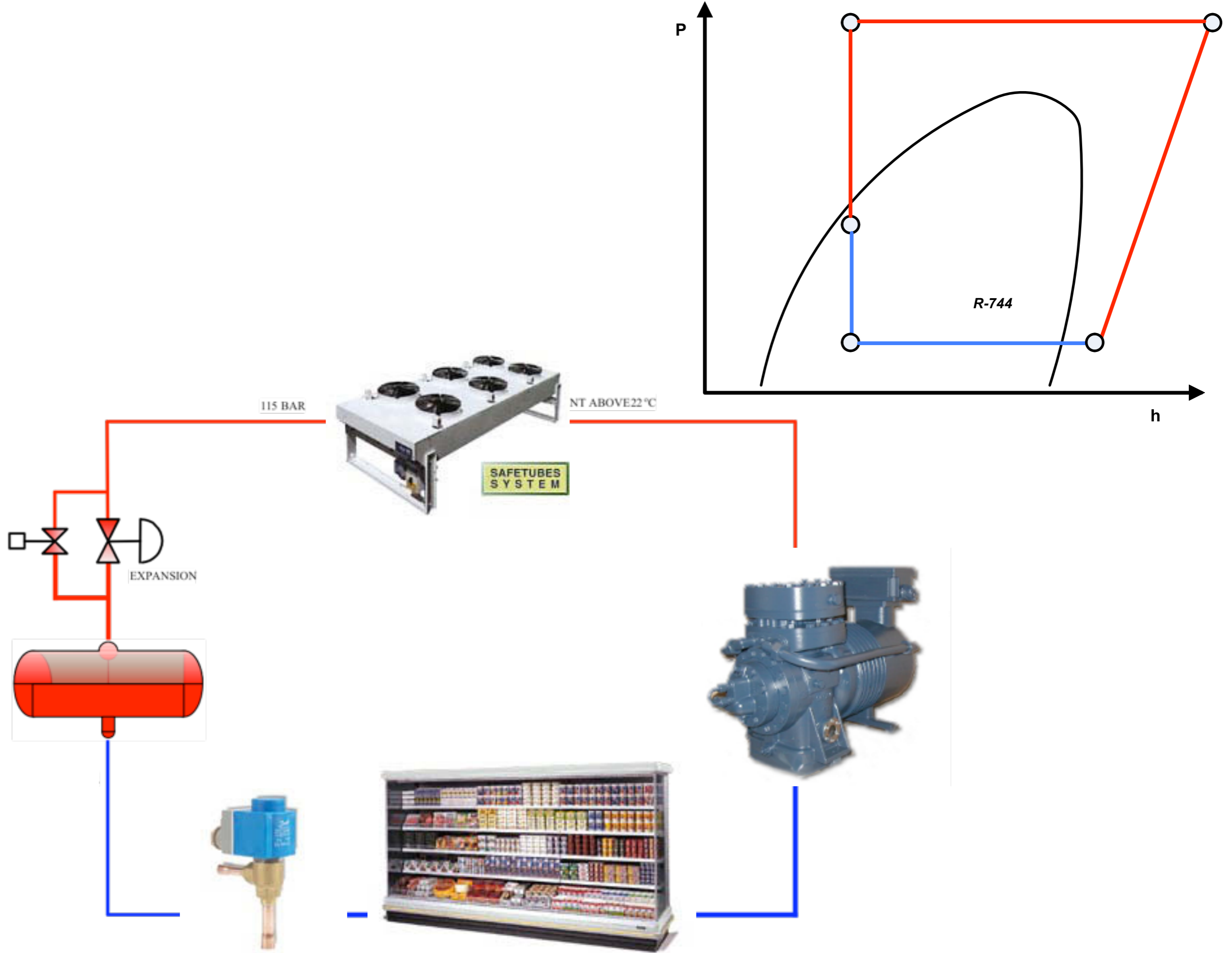


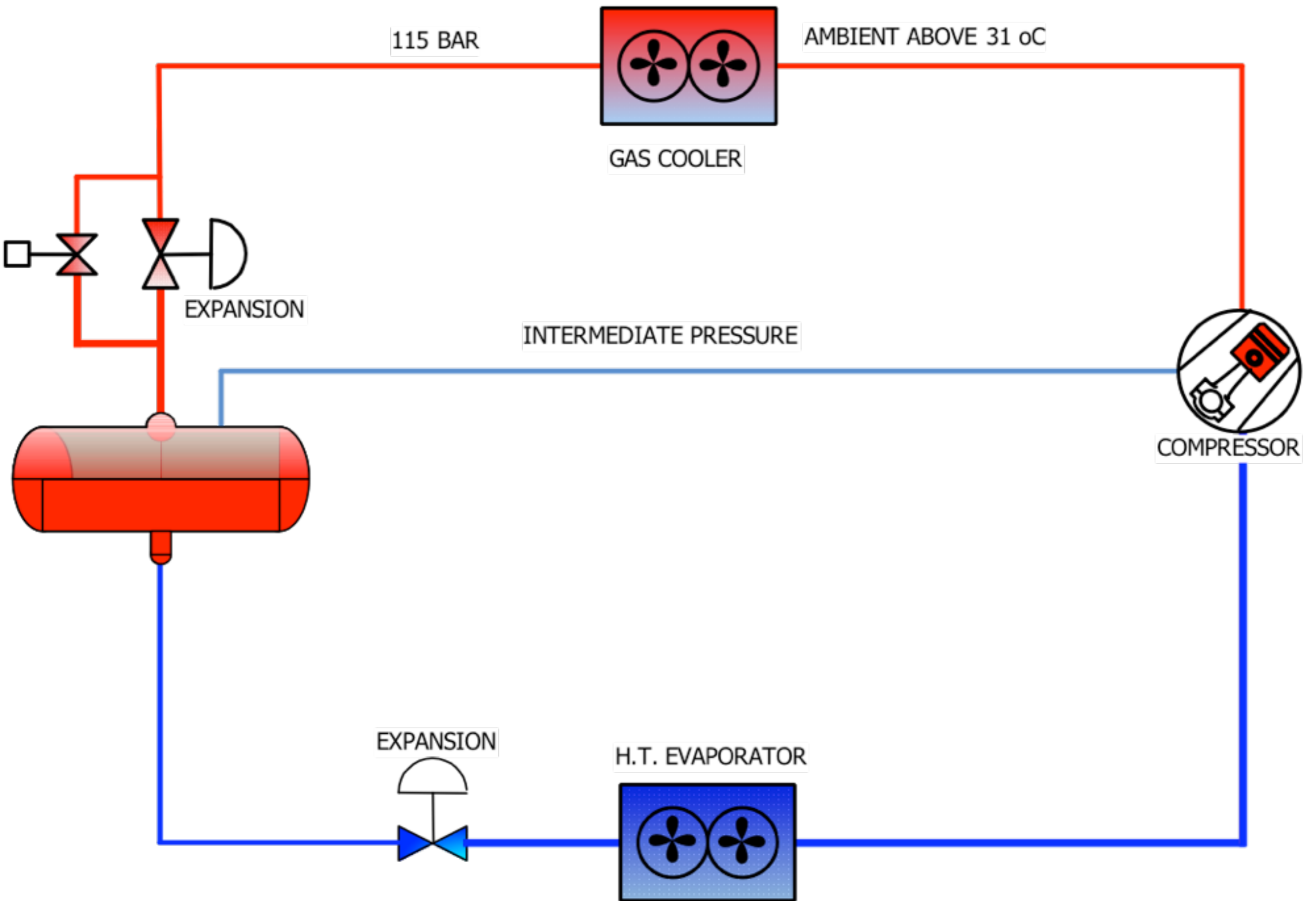






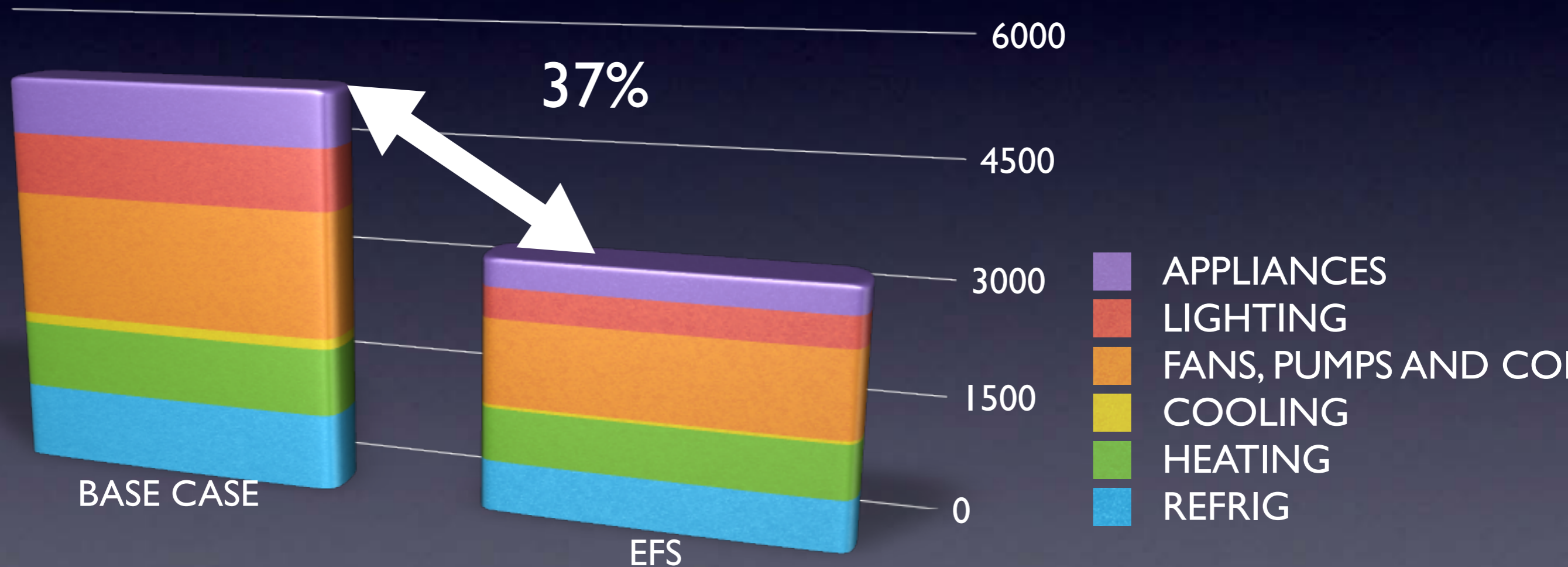






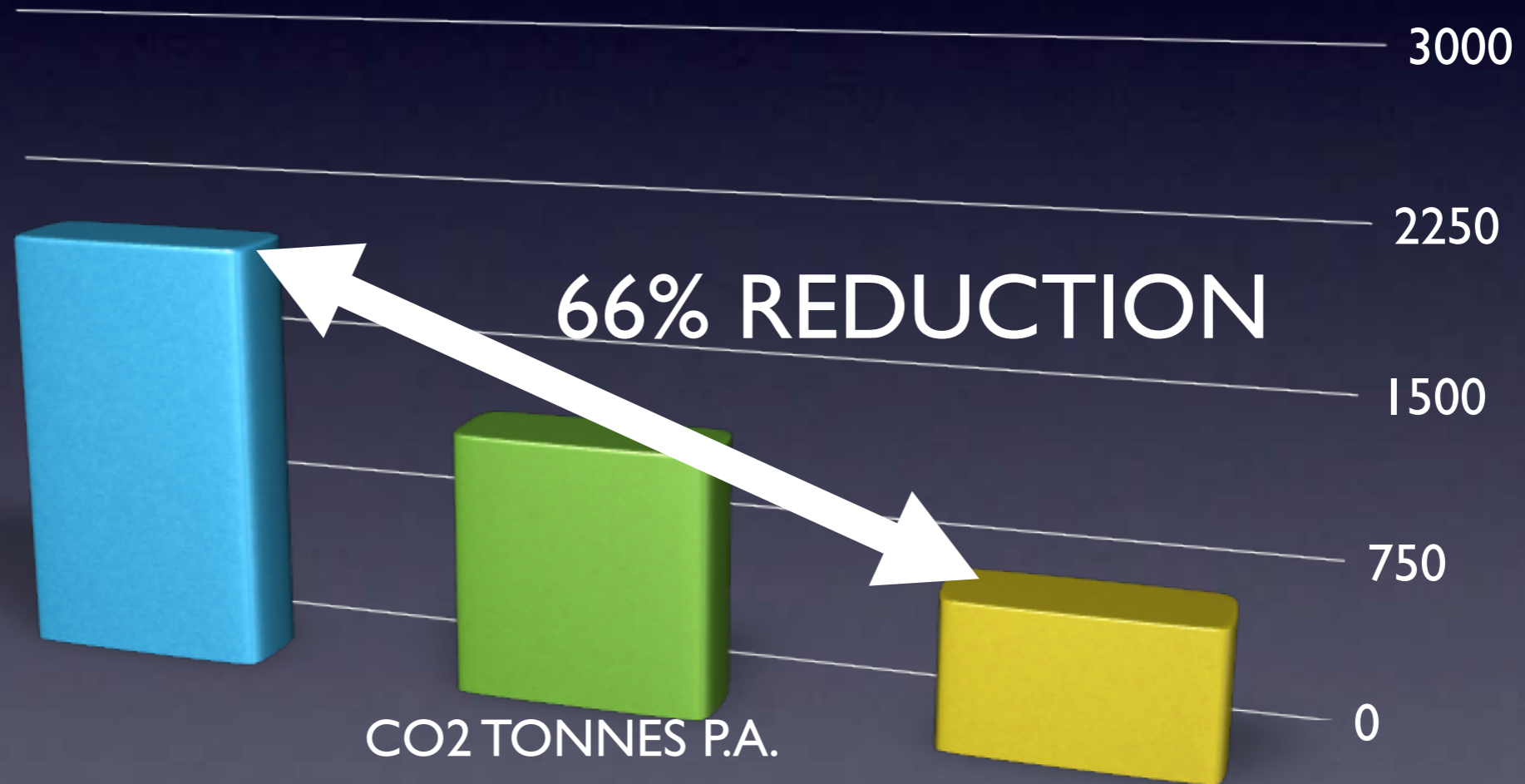
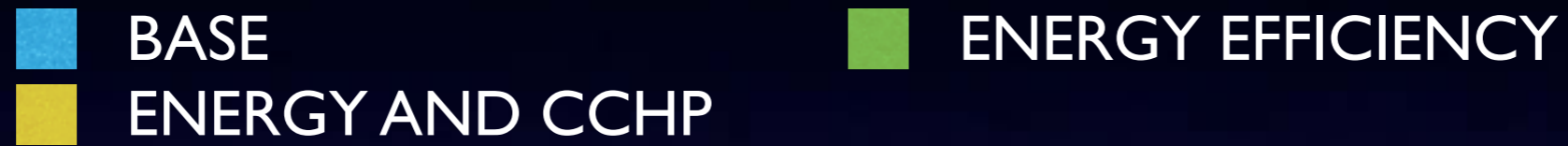
# Savings

# Energy Efficiency Impact





# Carbon Reduction



# Conclusions

- Most systems deemed a success
- Further integration required
- Redundancy requires removal
- G59 needs more project planning
- Refrigeration is the greatest gave the greatest individual benefit !

Thank You for Listening  
Go Raibh Mile Maith Agut Beith  
Ag Eisteacht Liom

Questions ?