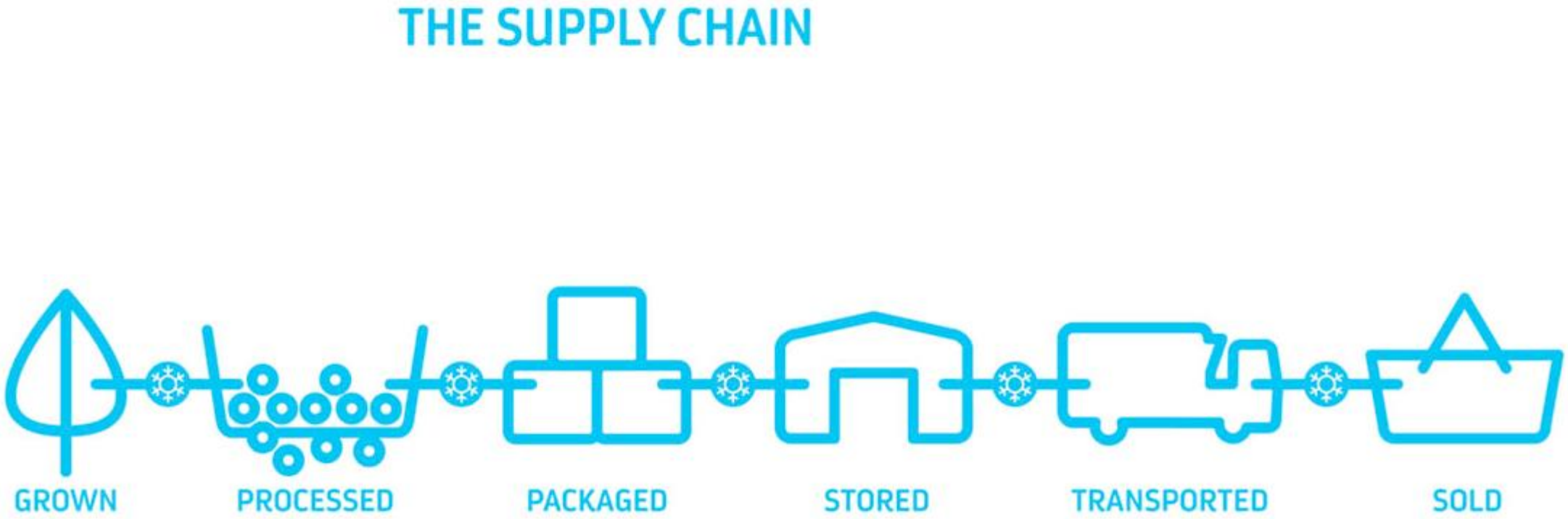
Cold Chain Energy Week
Day 2

Dave Pearson

Star Renewable Energy

STAR
DATA ANALYTICS

What is this all about ?



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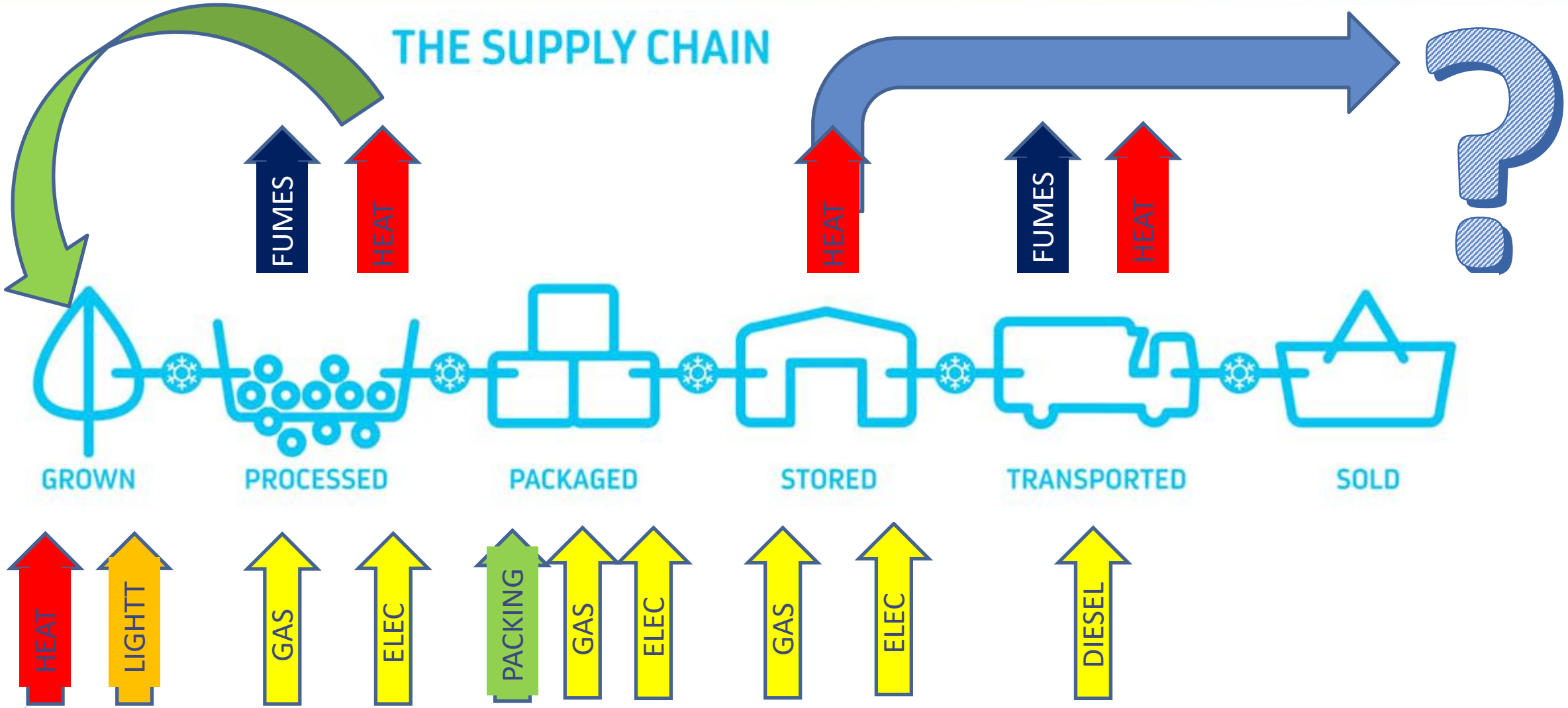

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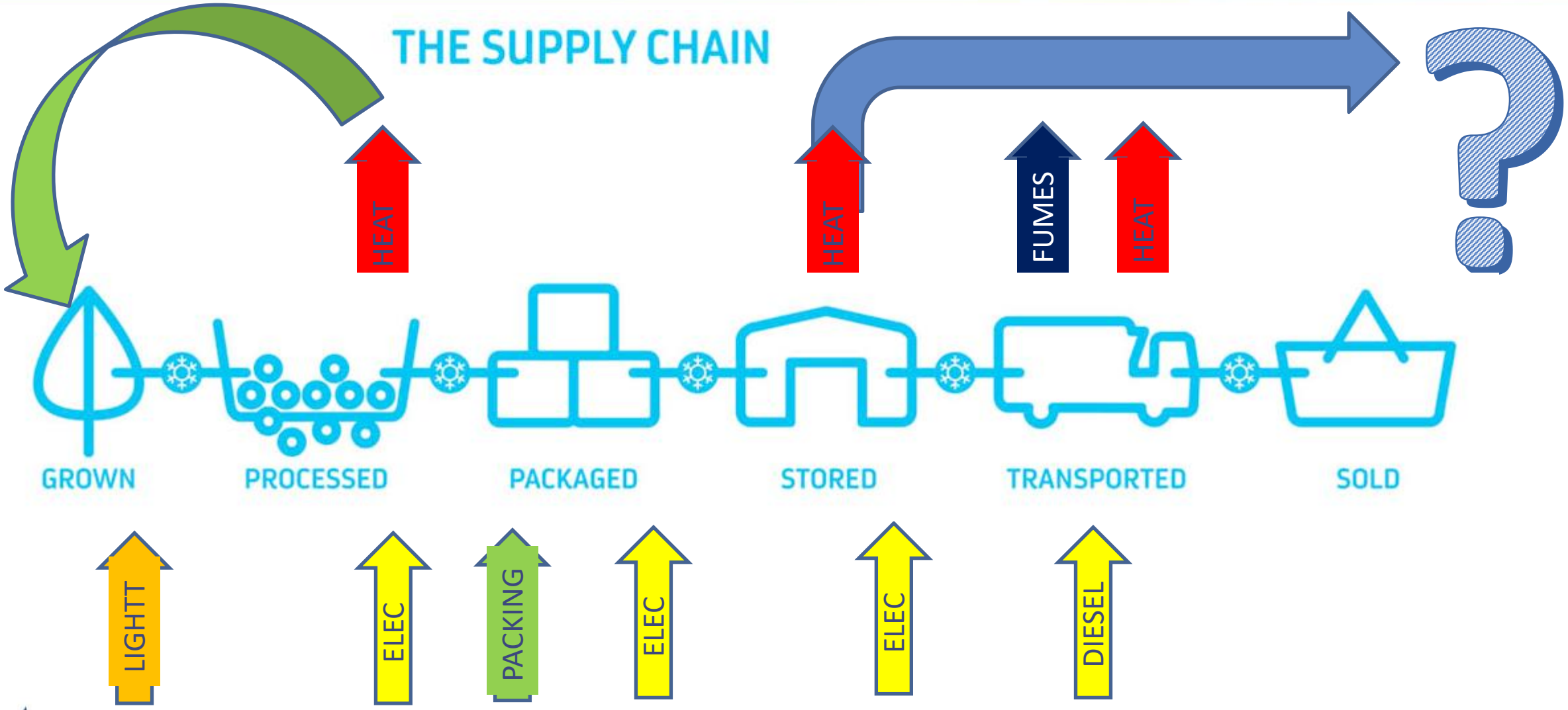

STAR DATA ANALYTICS

Collect Data - Standalone Data Logger and Sensors

4 d Map of (for heating and cooling):

- Location
- Grade
- Time available
- Quantity

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Collect Data - Standalone Data Logger and Sensors

4 d Map of (for heating and cooling):

- Location
- Grade
- Time available
- Quantity
- **Match up heating and cooling?**

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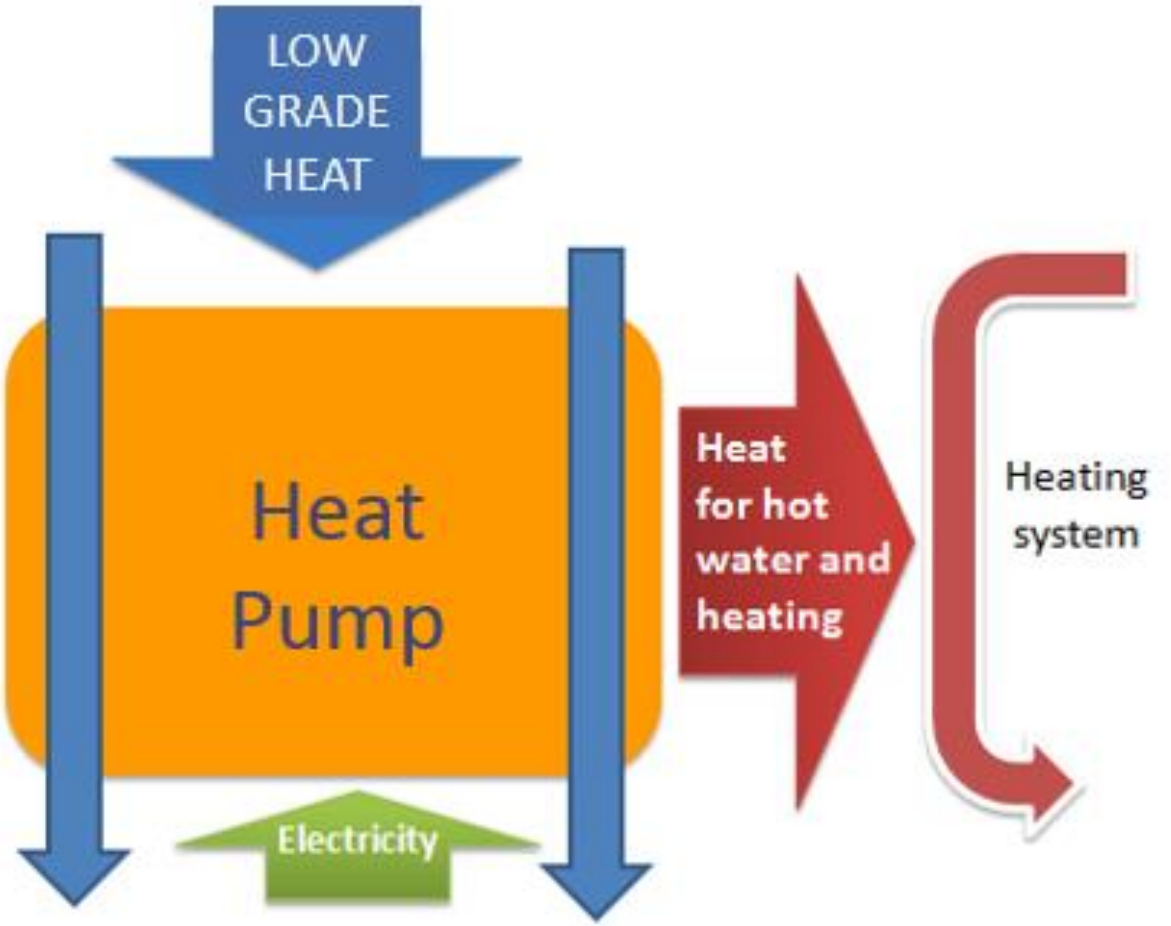

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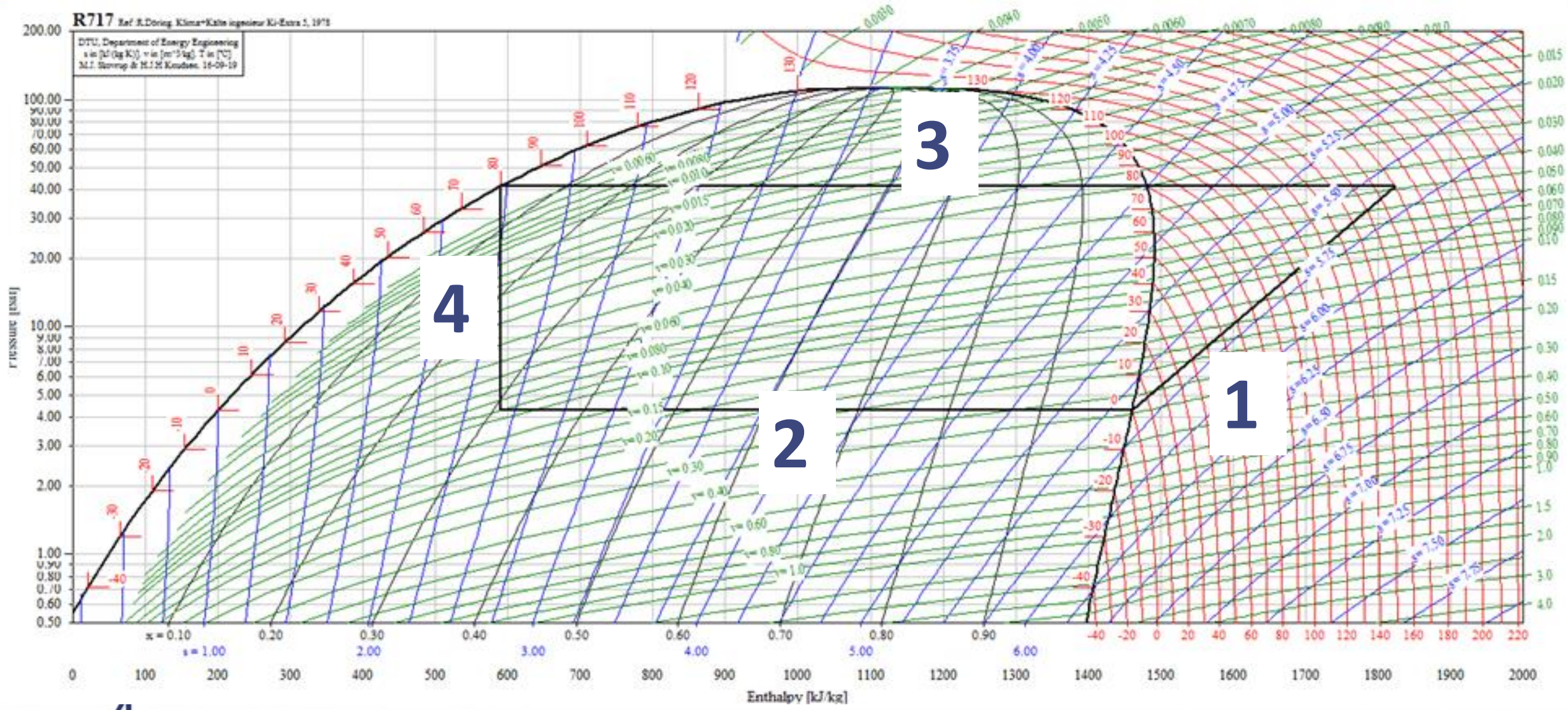
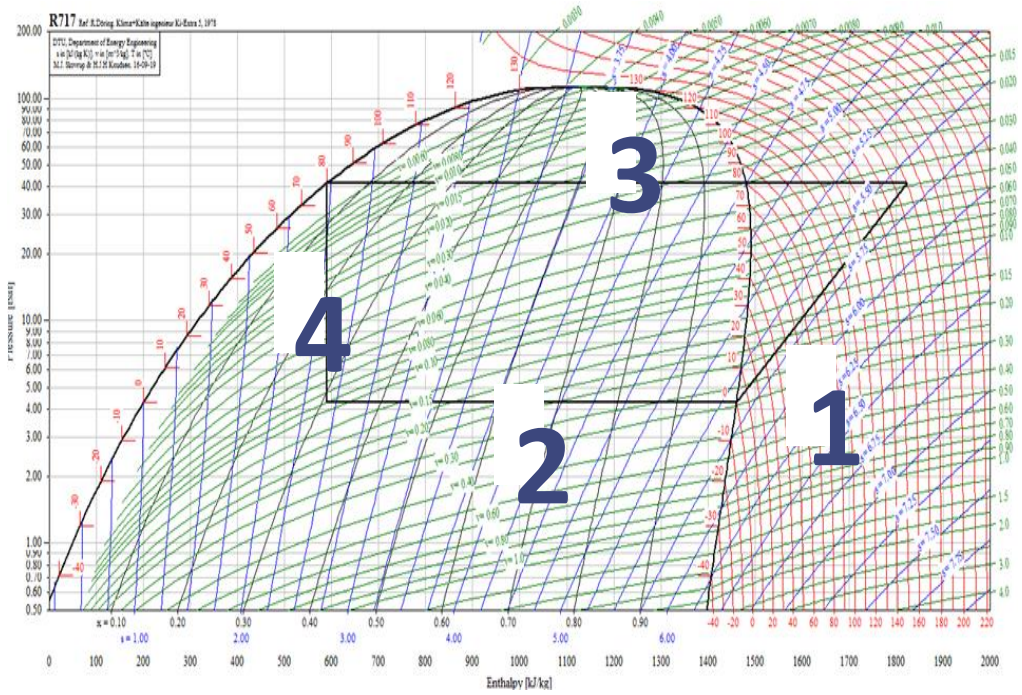
DATA ANALYTICS



STAR DATA ANALYTICS

How do we describe efficiency?



Cooling

- Cooling effect (2) / Work (1) = COPc
- (typical chiller will be better)

Heating

- All cooling PLUS work = Heating
- So heating = cooling + work
- Heating effect (3) / Work (1) - COPh

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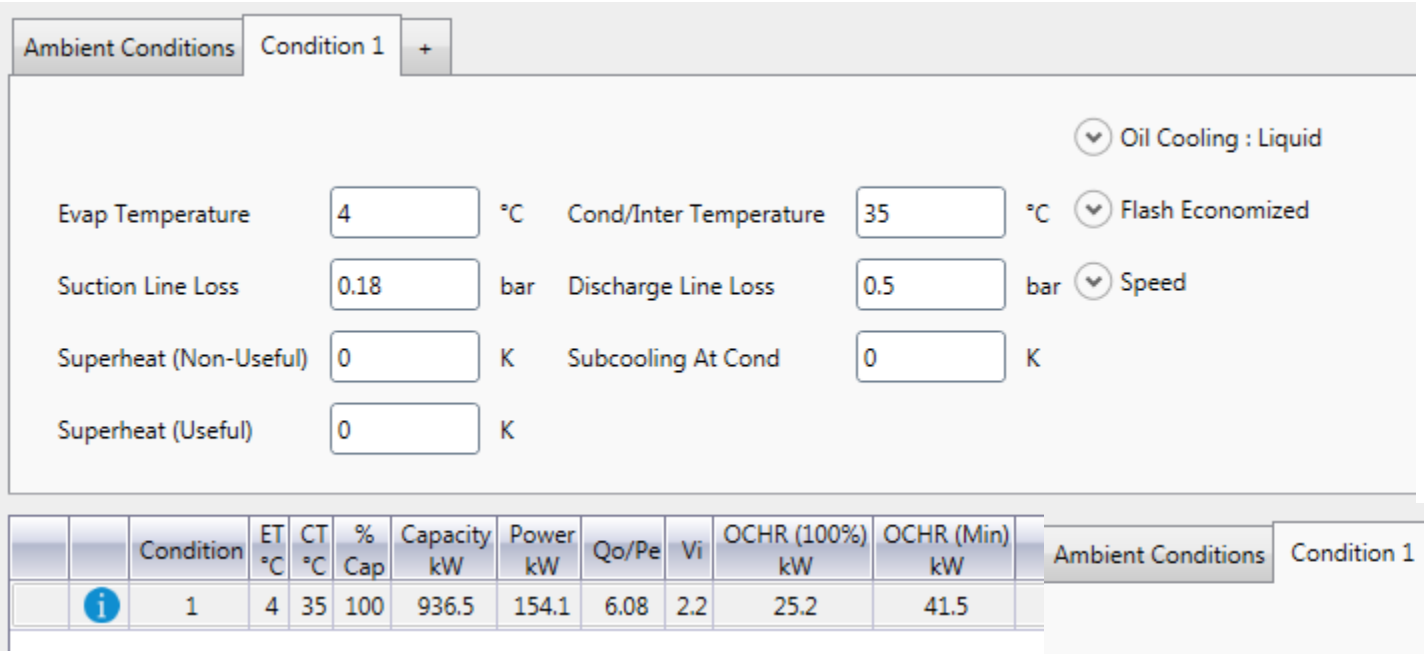
How do we describe efficiency?



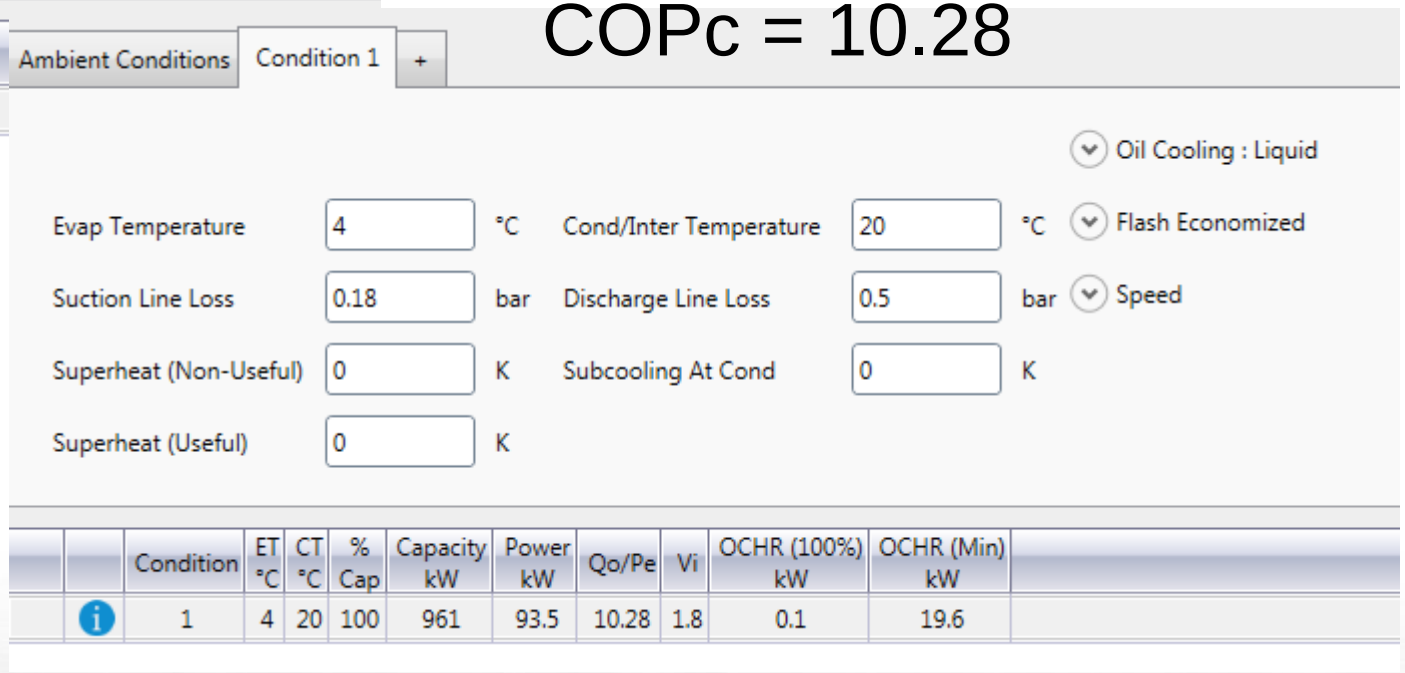
	Condition	ET °C	CT °C	% Cap	Capacity kW	Power kW	Qo/Pe	Vi	OCHR (100%) kW	OCHR (Min) kW
ⓘ	1	4	35	100	936.5	154.1	6.08	2.2	25.2	41.5

Cooling (4C to 35C)

COPc = 6.08

Cooling (4C to 20C)

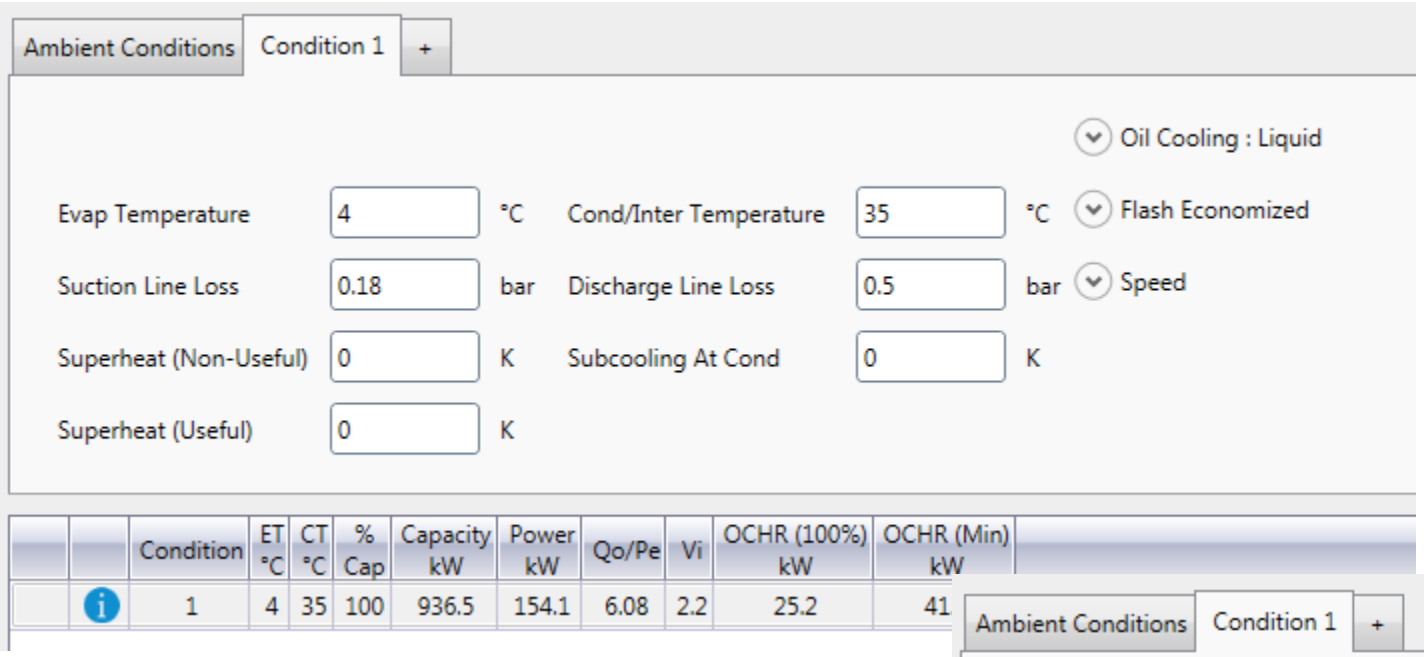
COPc = 10.28



	Condition	ET °C	CT °C	% Cap	Capacity kW	Power kW	Qo/Pe	Vi	OCHR (100%) kW	OCHR (Min) kW
ⓘ	1	4	20	100	961	93.5	10.28	1.8	0.1	19.6

STAR DATA ANALYTICS

How do we describe efficiency?



Cooling (4C to 35C)

COPc = 6.08

154kWe = 1090kWth (@35C)

Cooling (4C to 75C)

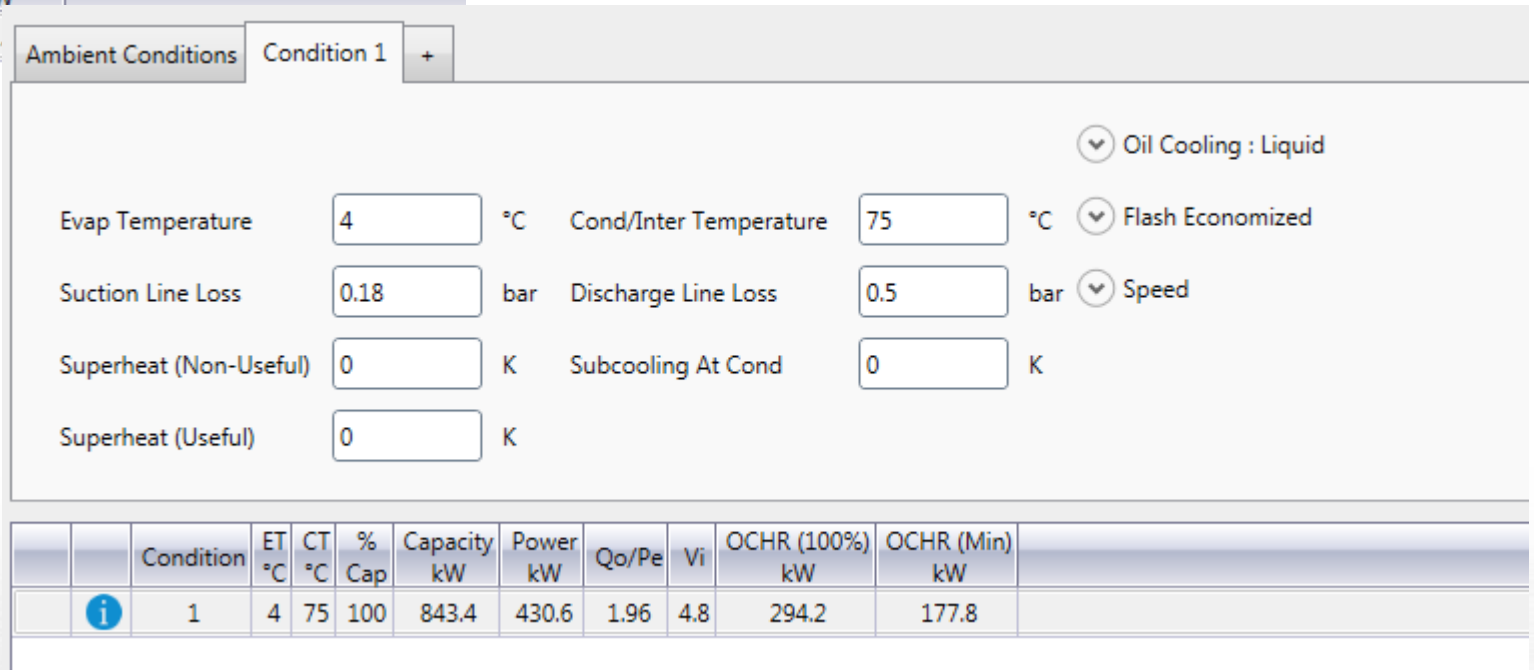
COPc = 1.96

430kWe = 1273kWth (@75C)

368kWe = 1090kWth (@35C)

So an extra 214kW gains 1090kWth **USEFUL**

COPhi = 5.09



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How do we describe efficiency?

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430kWe = 1273kWth (@75C)

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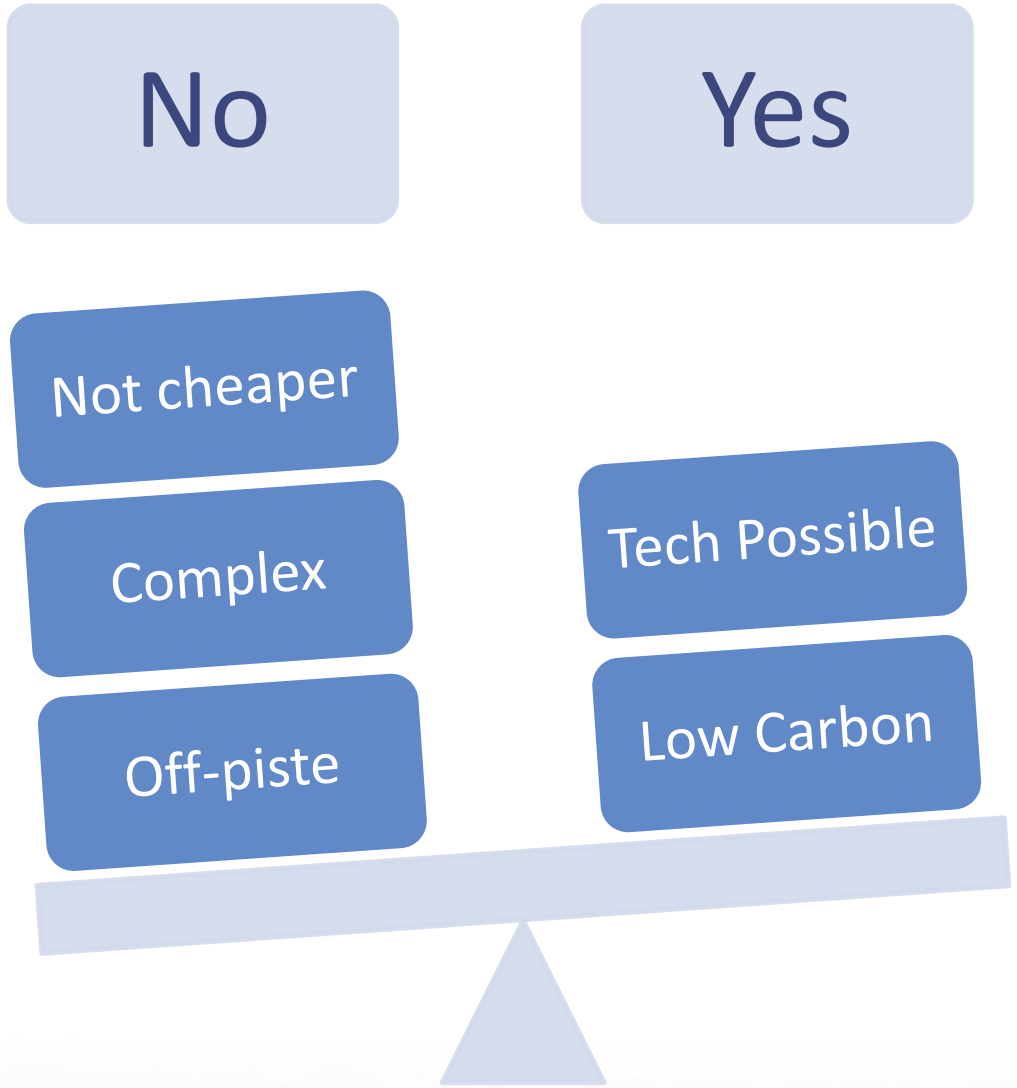
So an extra 214kW gains 1090kWth **USEFUL**

COPhi = 5.09

HOWEVER…… In winter The COPhi is 3.26

STAR DATA ANALYTICS

Conclusion- Is heat recovery a good idea……..



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But do your homework and gather the data

4 d Map of (for heating and cooling):

- Location
- Grade
- Time available
- Quantity

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Questions ??

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