



# AQUASNAP WITH GREENSPEED® INTELLIGENCE



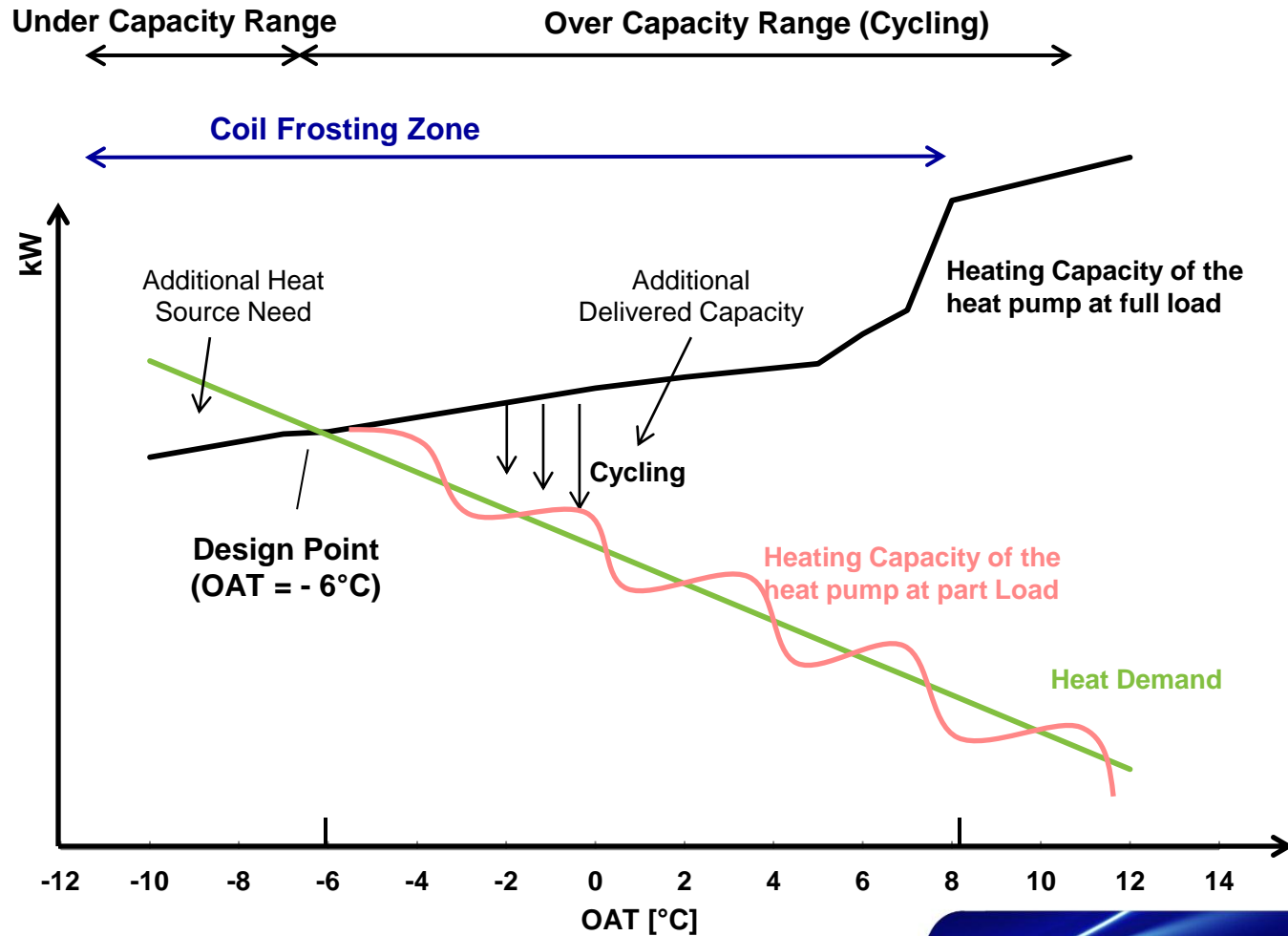
United Technologies



# FREE DEFROST

Marwan Chamoun

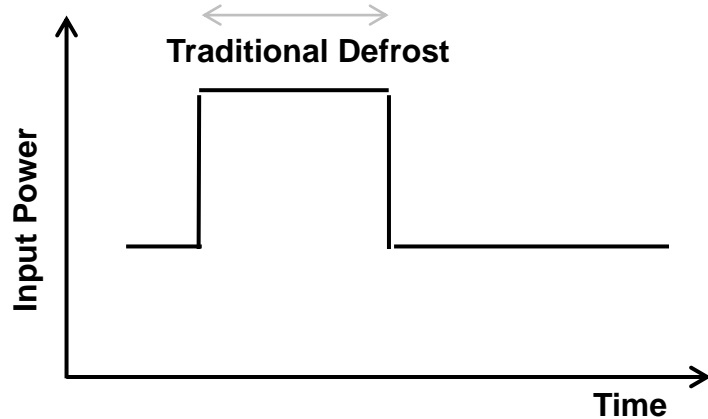
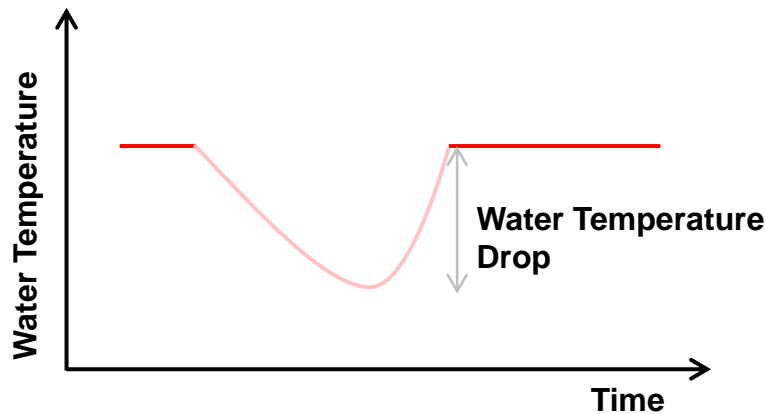
# TYPICAL HEATING APPLICATION





# TRADITIONAL DEFROST

**Traditional Defrost** reverses cycle and extracts energy from water loop in order to melt frost on the coil using all compressors and four way valve



**Traditional Defrost Impact**

**Four Way Valve is used**

- Vibration & Acoustic impact

**Cooled Water Loop**

- Reduced Comfort
- Lower Water Loop Temperature

**All Compressors are ON**

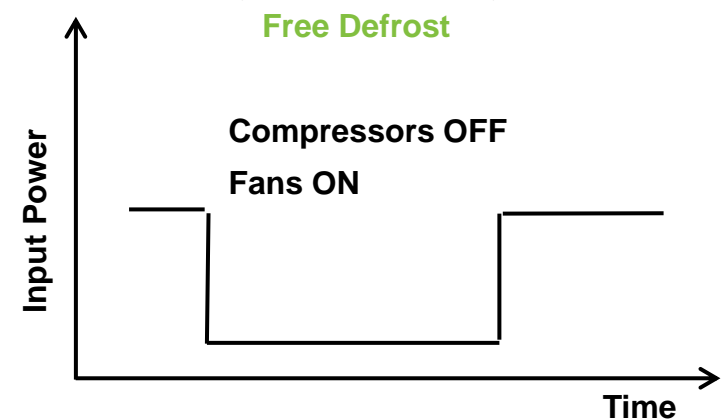
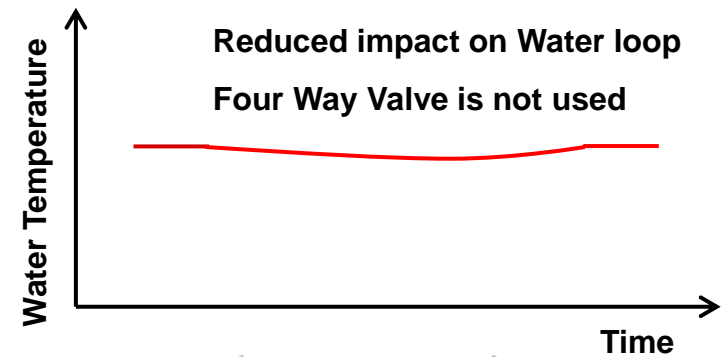
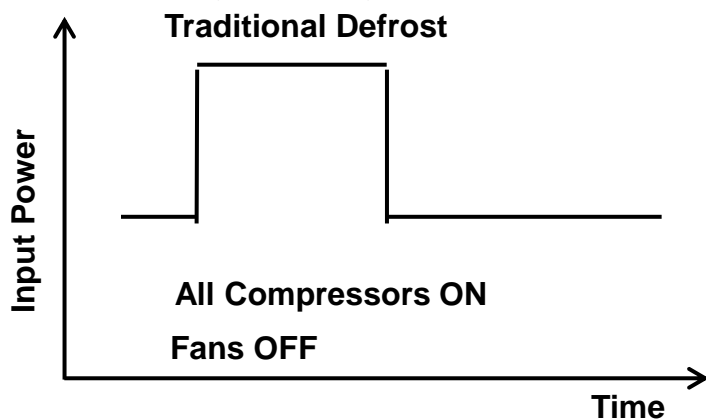
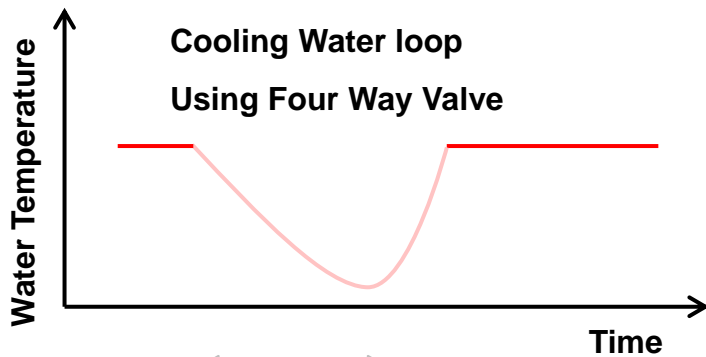
- High Power Consumption



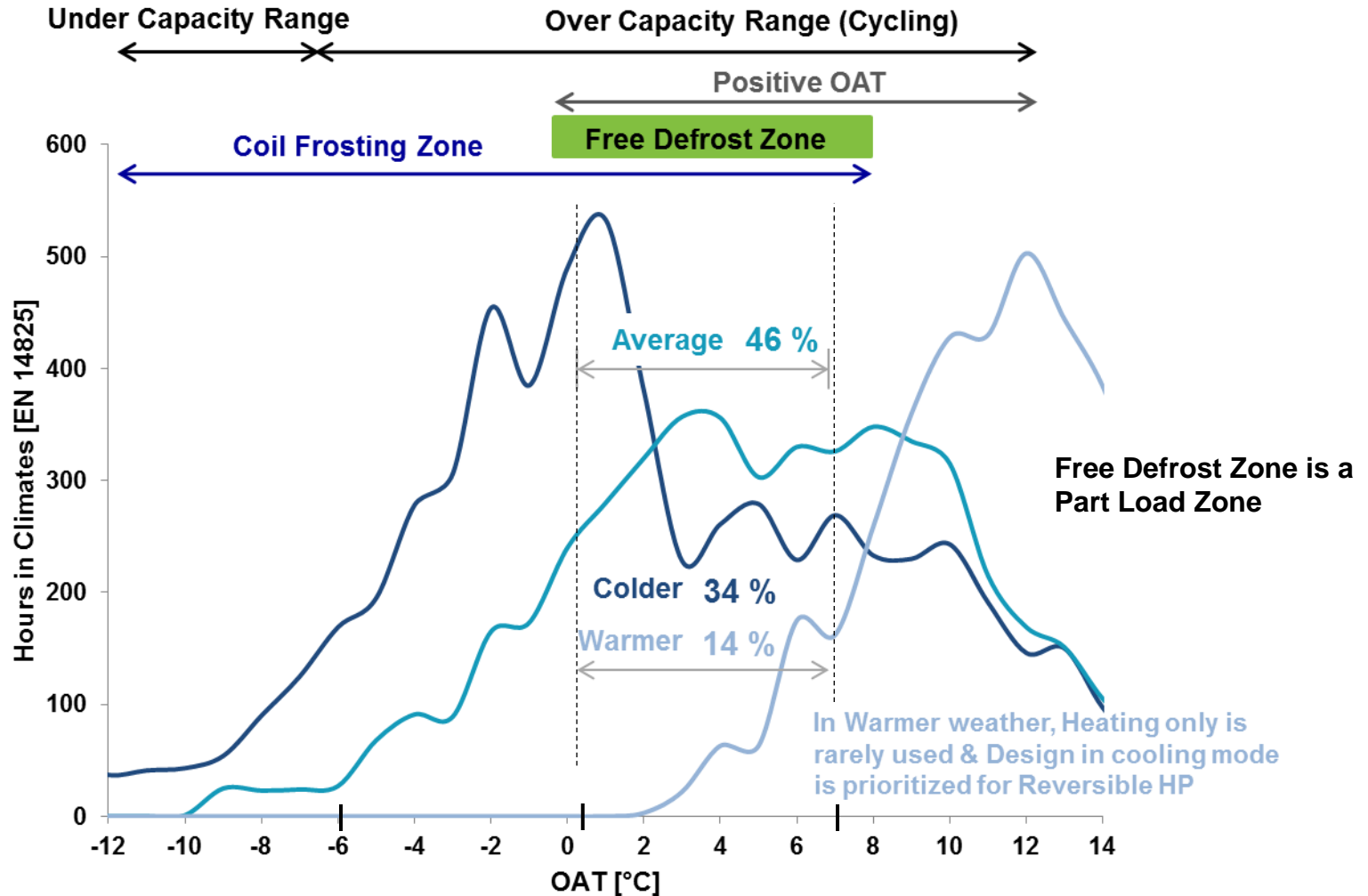
# FREE DEFROST

**Traditional Defrost** reverses cycle and extracts energy from **water loop** in order to melt frost on the coil using **all compressors** and four way valve

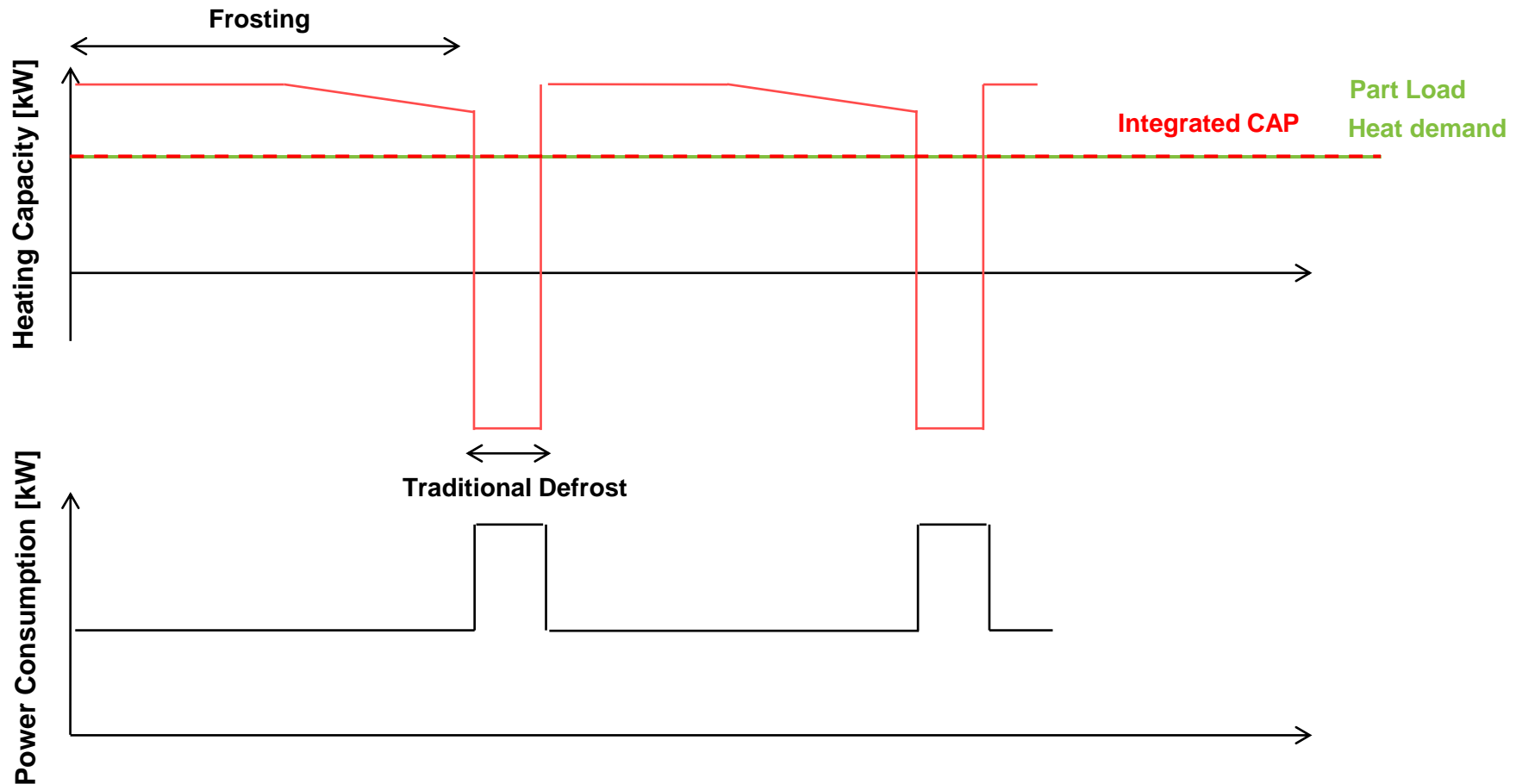
**Free Defrost** extracts energy from **Outdoor Air** in order to melt frost on the coil using fans while all **compressors** are **Off**



# FREE DEFROST ZONE

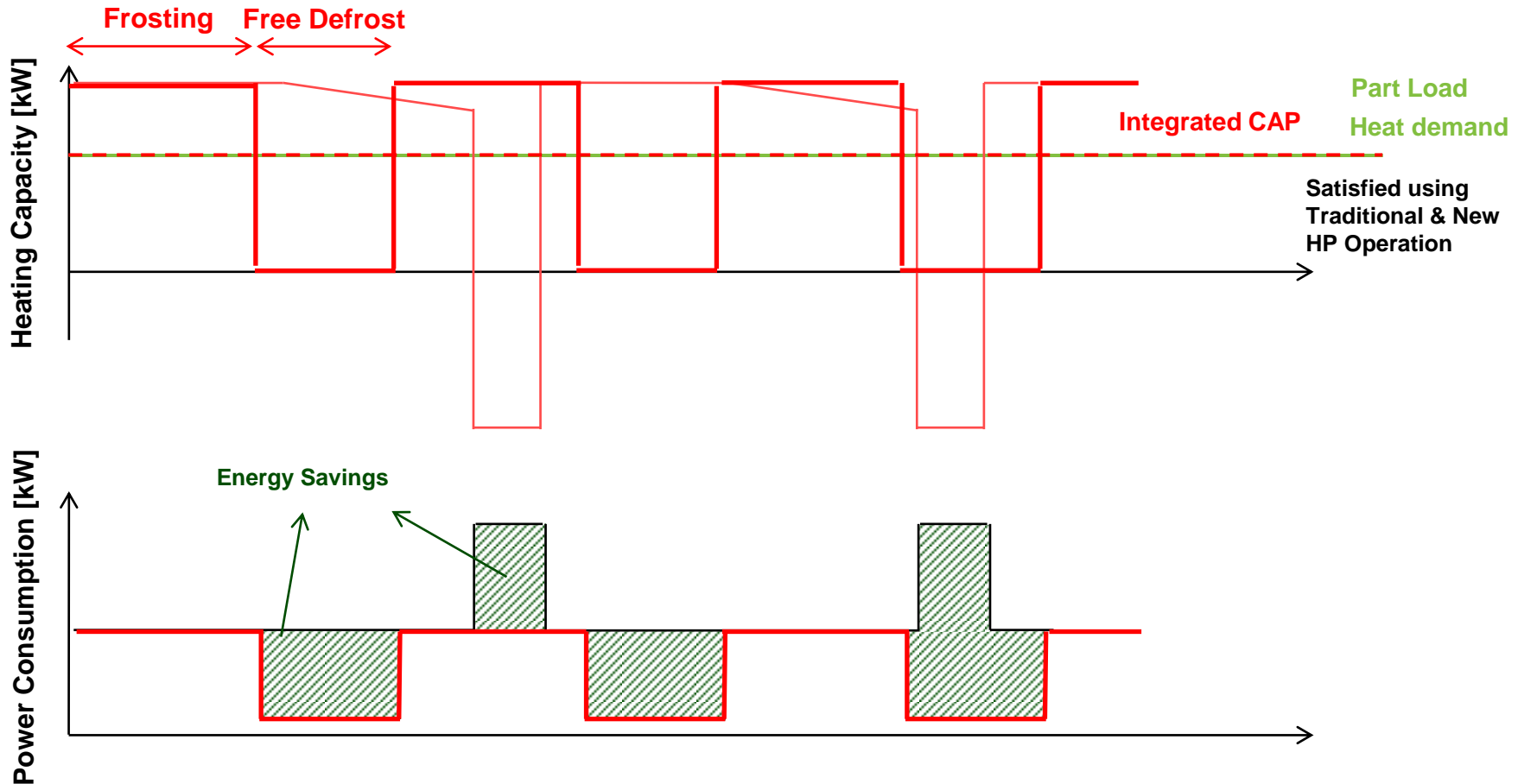


# TRADITIONAL HP OPERATION



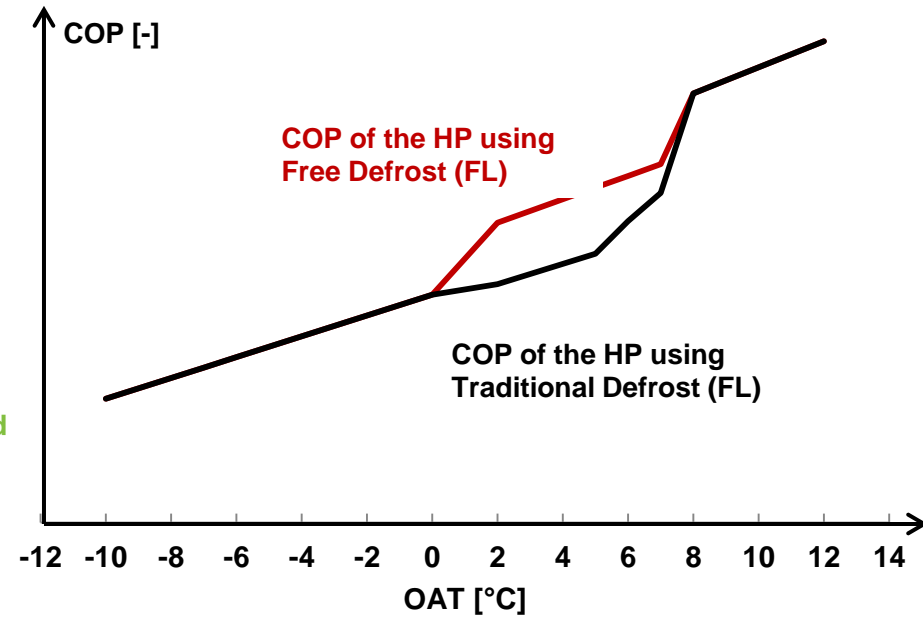
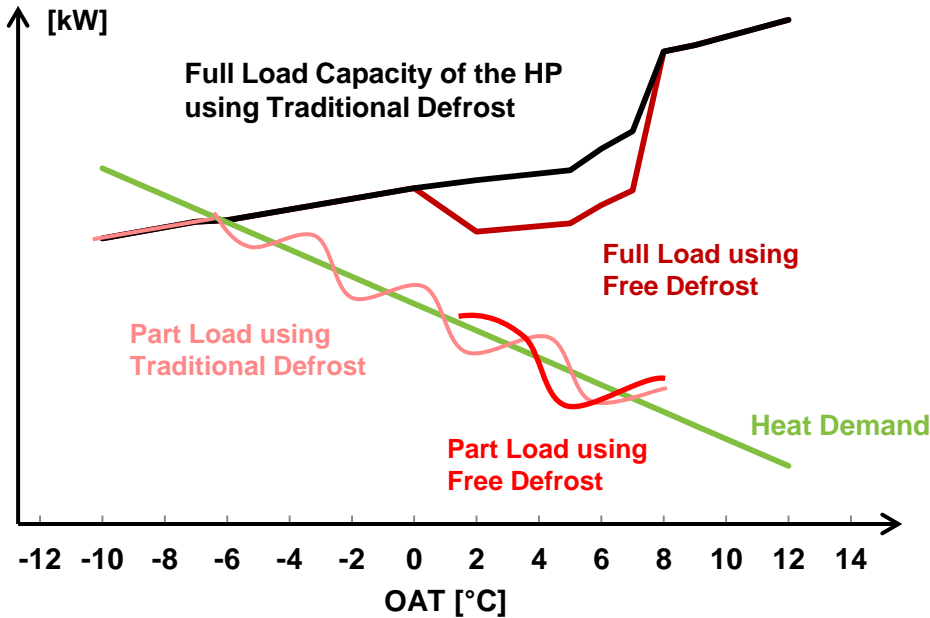
# NEW HP OPERATION

**Free Defrost** anticipates cycling to match heat demand while avoiding frost accumulation and defrosting **Naturally** using Outdoor Air





# OPTIMIZED CONTROL



At Full Load conditions, Capacity using FreeDefrost is reduced

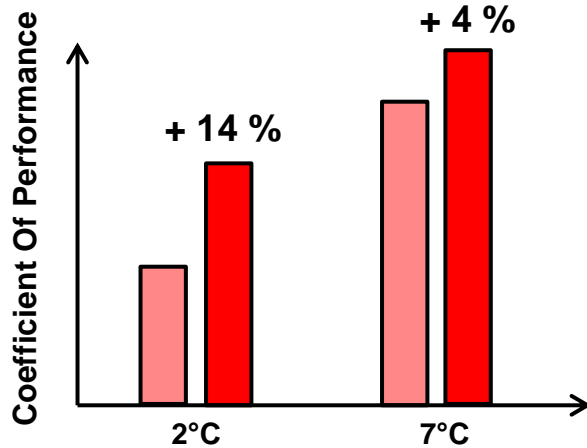
COP is improved using FreeDefrost

Automatic Switch to Mechanical Defrost if Building Needs not satisfied at FL using Free Defrost

# EFFICIENCY BENEFITS

## Higher Heating Efficiency

COP

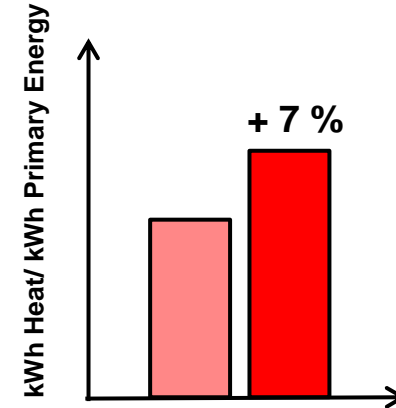


Outdoor Air Temperature

## Higher Heating Seasonal Efficiency

SCOP

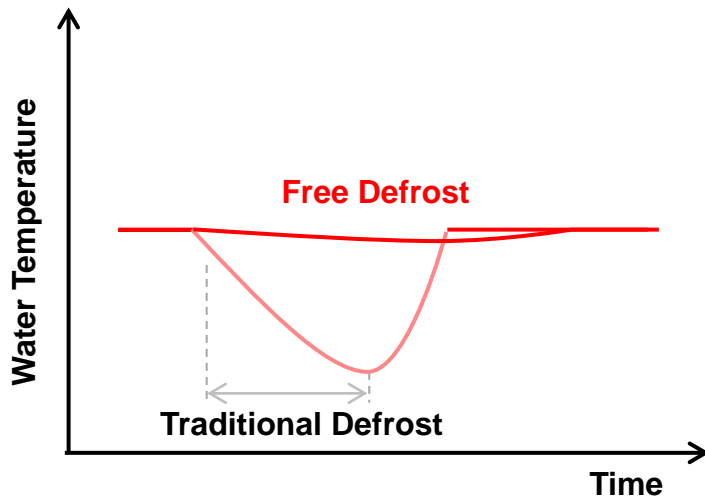
■ Free Defrost  
■ Traditional Defrost



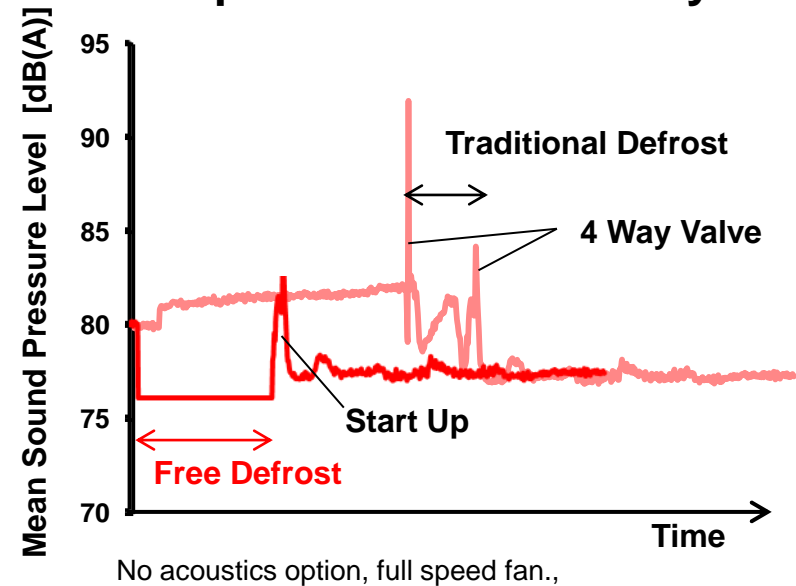
Average Weather Conditions

# COMFORT BENEFITS

## Improved Temperature Stability



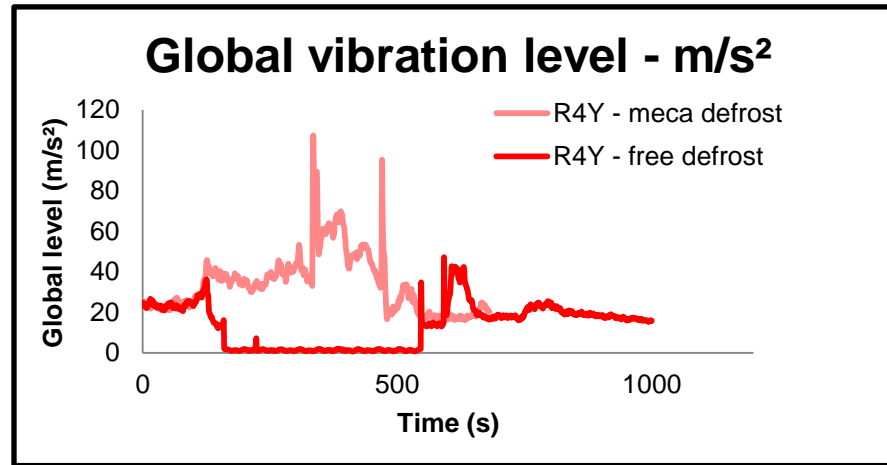
## Improved Sound Quality



**Improved Temperature Stability** eliminating negative impact induced by traditional defrost since the water loop is not cooled when defrosting using free defrost

**Improved Sound Quality** since the four way valve is not used while defrosting

# RELIABILITY BENEFITS



Global vibration level on one point of discharge pipe

**Improved Reliability & Vibration level** when using Free Defrost eliminating mechanical stress induced by cycle inversion



# FREE DEFROST BENEFITS

- **Higher Efficiency** improving Seasonal Efficiency up to + 7%
- **Lower environment impact** reducing CO2 emission
- **Improved comfort** eliminating negative impact induced by traditional defrost
- **Reduced Noise & Vibration level** eliminating cycle inversion
- **Superior Reliability** eliminating mechanical stress induced by cycle inversion