

# Case Study at Stennis Space Center, MS.

Energy Savings Solutions  
Started July 2014-July 2015

# Case Study at Stennis Space Center, MS

## What makes the Chiller Plant

- **Chiller(s) at SSC 2-WME 700 ton Magnetic Chillers 1-WMC300 magnetic Chiller**
- **Baltimore Air Coil FXV Closed Circuit Cooling Towers 500 tons each**
- **Chill water pumps are 60 HP 480v/3ph 1775 RPM 1400 GPM 75FTHD**
- **Condenser water pumps 60 HP 480v/3ph 1800 RPM 2100 GPM 40 FTHD**
- **All pumps have VFD's CHW/CW**

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## Criteria Requirements

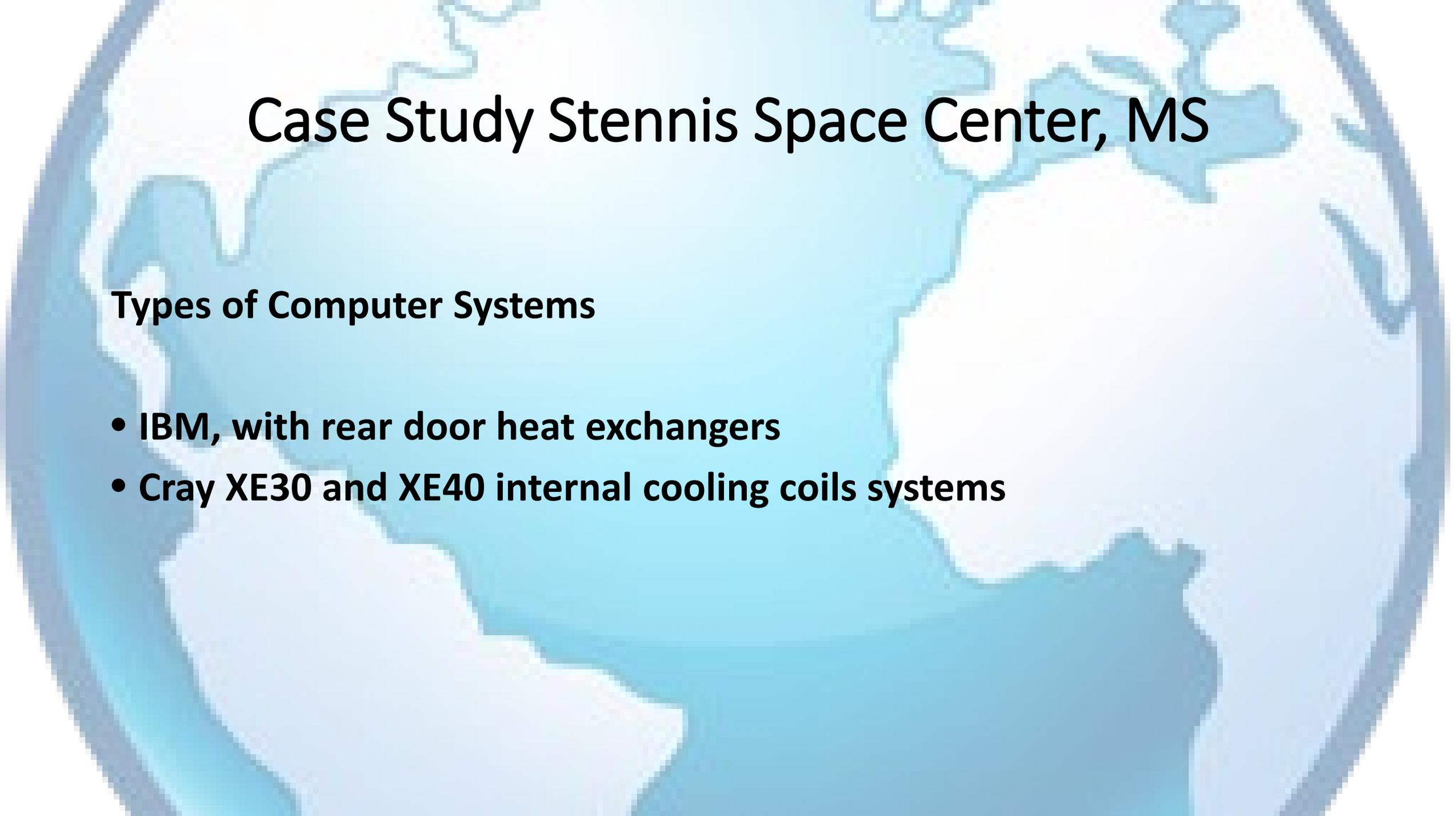
- Upgrade an existing Data Center Water Cooled Centrifugal Chiller Plant with better Energy Efficient systems and strategies
- Provide Energy Reduction in a Hot, Humid Climate Zone
- Reduce the energy usage to improve the yearly PUE
- Maintain uptime and reliability
- Incorporate control system to meet the criteria 24/7/365
- Cooling required is 500 tons with expansion plans



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## Products Selected

- **Daikin Magnetic Bearing (WME700) oil free chillers**
- **BAC Closed Circuit Cooling Towers**
- **Controlled Water Results Process Control Design**
- **Honeywell Webs AX Niagara Platform**



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## Types of Computer Systems

- **IBM, with rear door heat exchangers**
- **Cray XE30 and XE40 internal cooling coils systems**

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## Energy Measures

- **Entering Water Temps 63F (This was done in steps)**
- **CWR controls system was installed**
- **Controls were programmed to optimize the site environmental dynamics (During start up and commissioning seasonally)**
- **Monitoring and trend data to record the plant KW/t**
- **Monitoring and trend data for the rack performance**

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## Results

**Typical water cooled chiller plant kW/t averages 1.5 or higher**

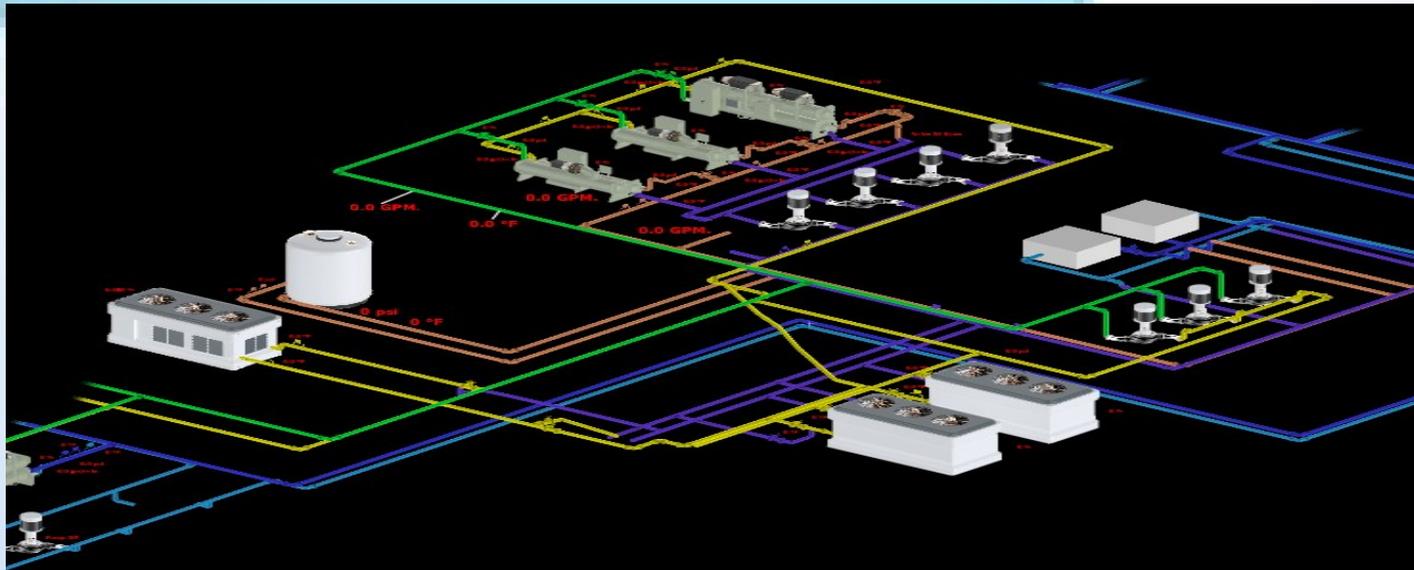
**While newly designed efficient plants approach kW/t of 1.2**

**Our Results for the entire Chiller Plant:**

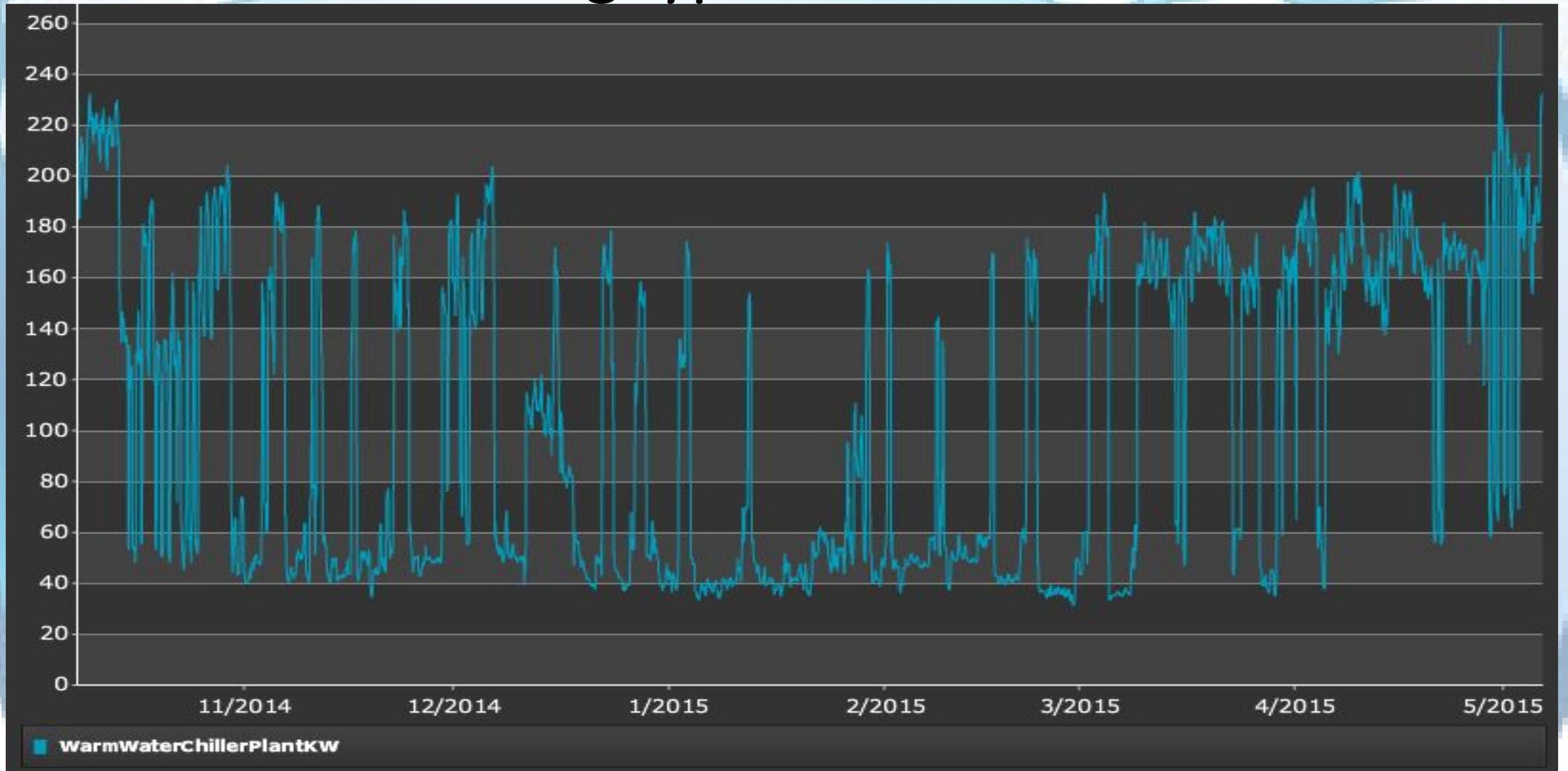
- Peak Hot weather conditions August 31 Total plant kW/t 1.222 at 89.1F ambient, 78F wet bulb (cool summer for MS)**
- Lowest kW/t was March 6, 2015 kW/t of .181**
- Over 1450 hours from July '14 – July '15 cooling kW/t at high of .999 to the low of .181 Under 1.000 kW/t was accomplished**

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- **Plant KW/t using High Efficient Chillers and CWR Control System reduced the Hot/Warm weather ~25%**
- **In Comprehensive Cooling Mode Cooler Weather conditions the Reduction was from Mid to Upper 300/250+KW range Reduced to 51-31KW Same Load Same Amount of Work**



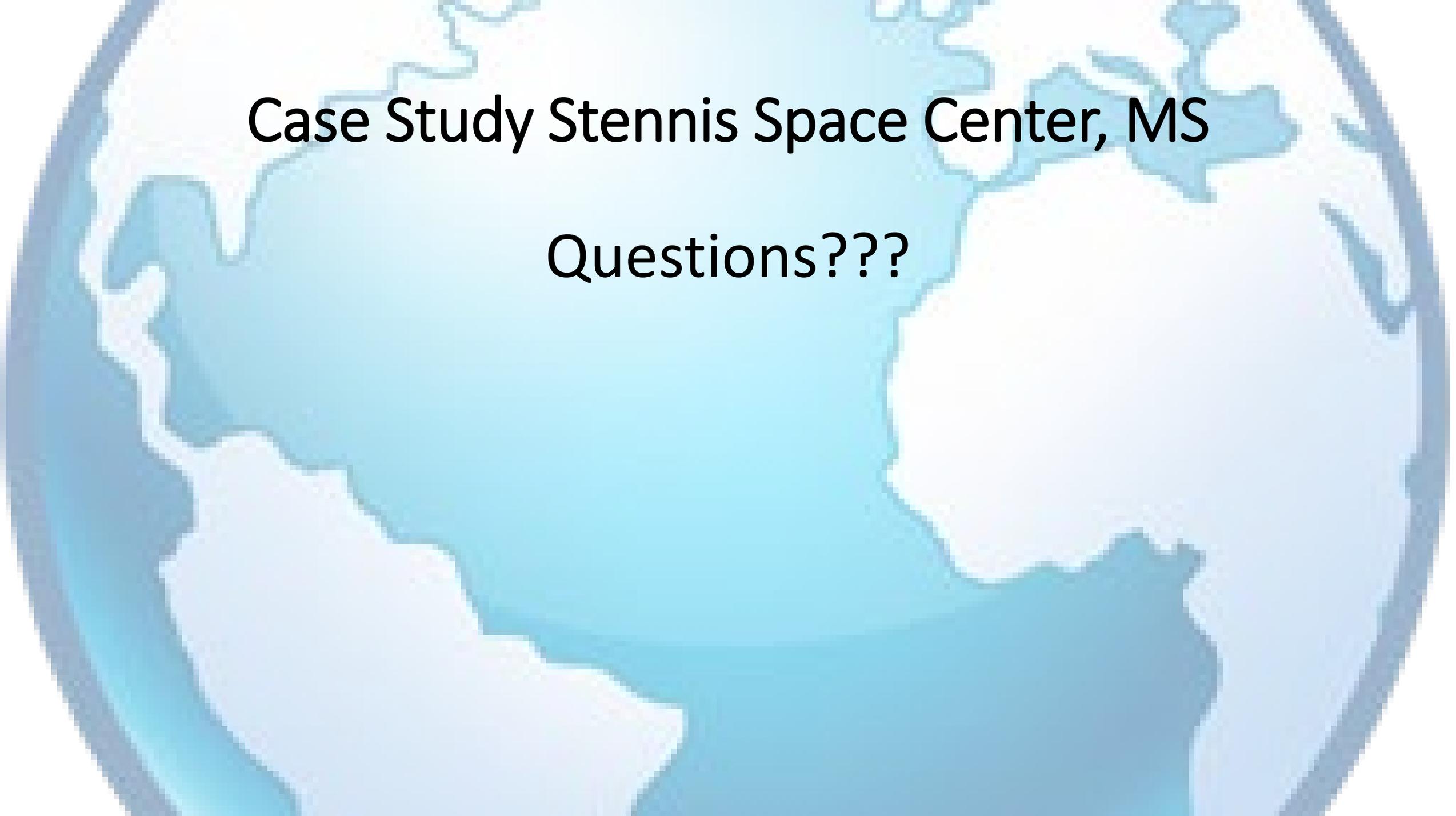
# Case Study Actual Graph showing the reduction of KW during typical run conditions



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## Energy Savings Availability in “Better Climate Zones”

- Operating kw/h 24/7/365 8760 hours/year
- Operating kw/h Comprehensive Cooling Mode
- Different regions what are the savings
- Examples for better weather states
- Oak Ridge, TN using the CWR process EWT 60F 4495 hrs. 51%/year  
EWT of 45F 2329 hrs. 26%/year 2014
- Dayton, OH using the CWR process EWT 60F 5331 hrs. 60%/year  
EWT 45F 3159 hrs. 36%/year 2014



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Questions???