

Innovative Energy Efficiency Approaches in NOAA's Environmental Security Computing Center



- Study conducted by Lawrence Berkeley National Labs
- National Oceanic and Atmospheric Administration's data center in Fairmont, West Virginia
- Innovative solutions were needed for improving the facility energy efficiency
- Dry Coolers were installed to cool the data center without chiller operation when the outdoor temperature was below the chilled water return
- **Rear Door Heat Exchangers (RDHx)** were installed on most of the racks for more efficient heat transfer
- Hot aisle containment were installed as an energy saving measure for those racks not using the **RDHx** technology.
- The study estimates the impact of energy efficiency measures (EEM's)

The deployment of the RDHx allowed for a higher inlet air temp and higher water temperature, leading to:

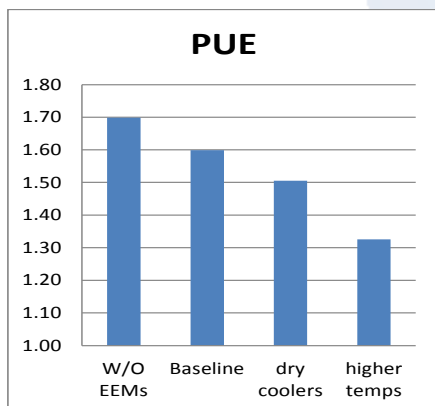
- PUE reduced by 17%
- Cooling energy reduced by 38%
- Fan energy reduced by 50%



RDHx and Piping



Dry Coolers/Chillers



Impact of EEMs on PUE and Annual Energy Use

Use Point	Estimated Annual Energy MWh			
	W/O EEMs	Baseline	dry coolers	higher temps
Current IT Load	7,000	7,000	7,000	7,000
UPS Loss	370	370	370	370
PDU/trans loss	260	260	260	260
Standby Gen	130	130	130	45
Lighting	160	160	160	45
Cooling	3,300	2,750	2,100	1,300
Fans	670	520	520	260
TOTAL	11,890	11,190	10,540	9,280
PUE	1.70	1.60	1.51	1.33

Impact of EEMs on PUE and Energy Use