



Military Sealift Command Energy Conservation Overview

Fleet Energy Training Forum

*Mr. Sonjae Whang
MSC Energy Resource Branch, N726*

*Naval Station Norfolk
25 March 2014*



Agenda



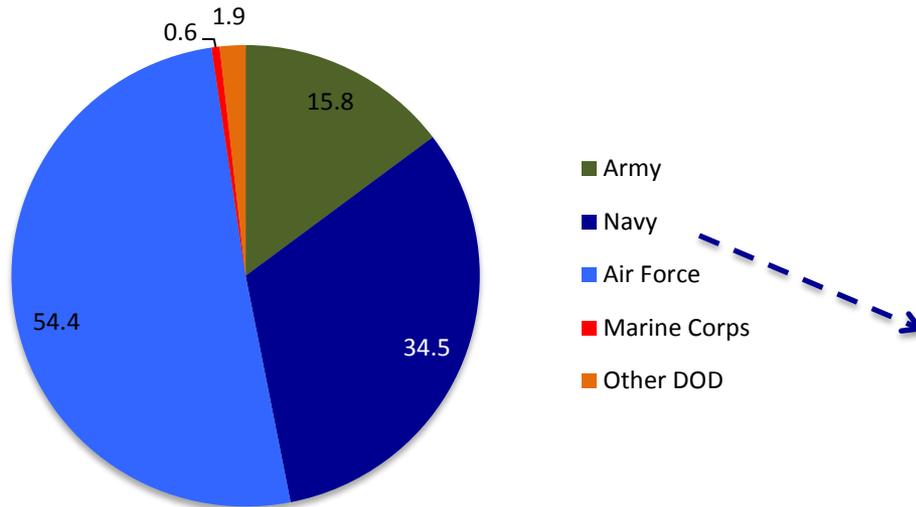
- ***Quantifying Fuel Usage***
- ***US Navy Energy Goals & MSC ENCON Program Alignment***
- ***MSC Energy Conservation Organization***
- ***Culture Change***
- ***MSC ENCON Training***
- ***Summary***



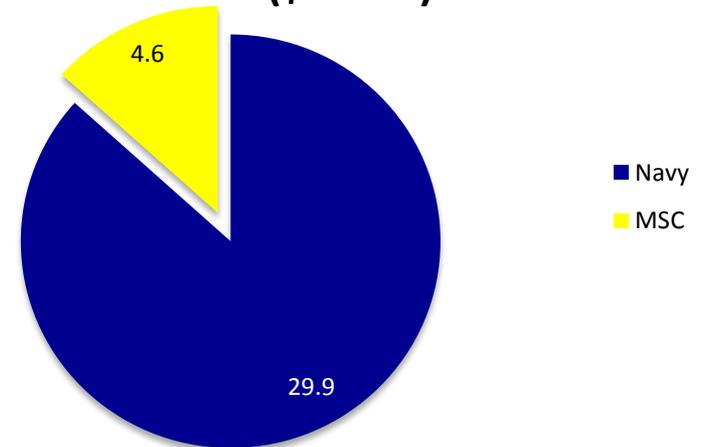
DOD Fuel Usage



DOD Operational Energy FY11 Total 107 Million Barrels



Navy Operational Energy FY11 Total 34.5 Million Barrels (\$5.18B)



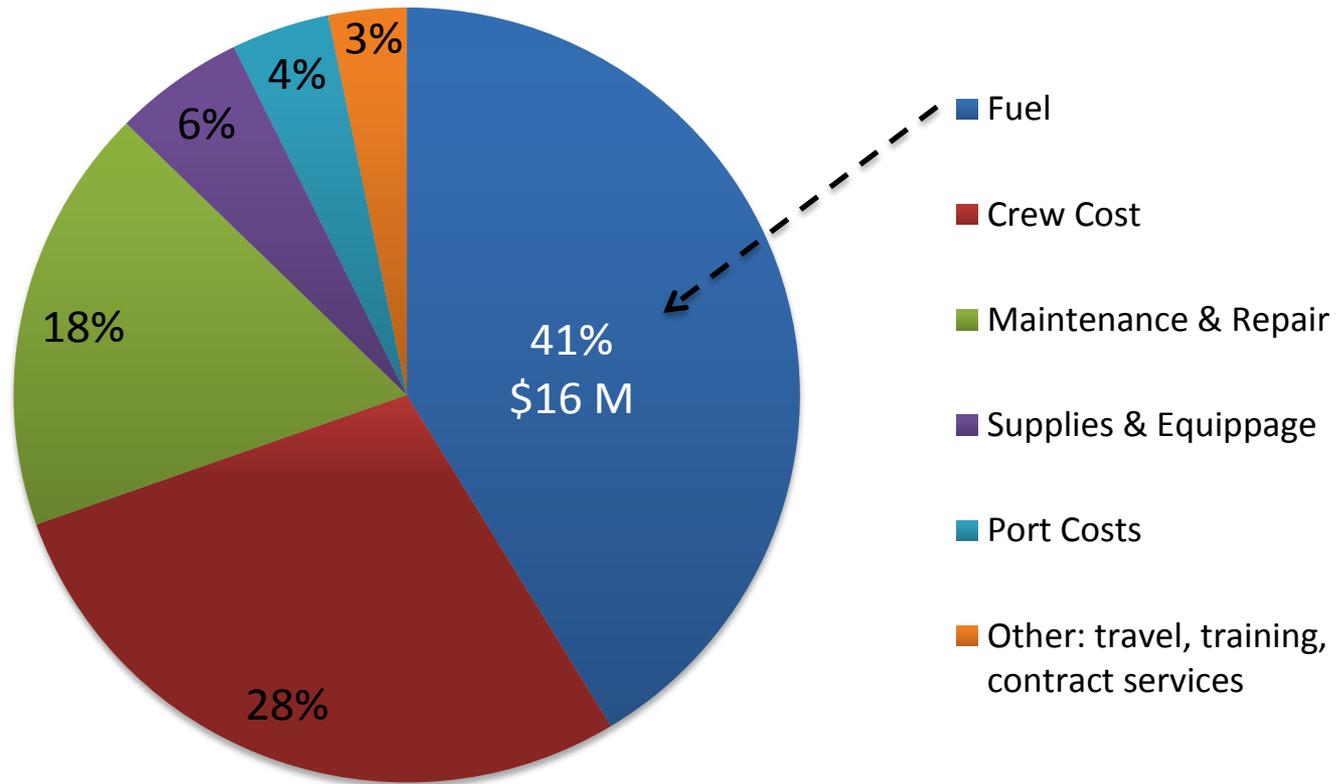
MSC Represents 13% of the Navy's Operational Energy Usage



Annual MSC Ship Operating Cost



T-AKE Annual Operating Costs



Fuel Represents the Largest Potential Savings Opportunity!



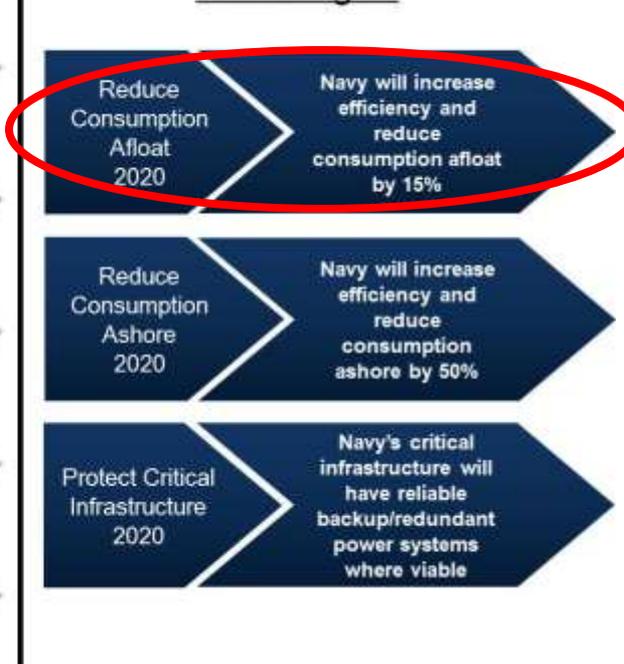
US Navy Energy Goals & MSC ENCON Program



SECNAV Targets



CNO Targets



USFF Command Goals



MSC's Energy Conservation Program Initiatives Lining Up to Navy Energy Goals

- | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • 2016 Great Green Fleet WGs Member • Collaboration with NAVSEA 05D4 and Member of T-AO(X) Energy Working Group | <ul style="list-style-type: none"> • On target for meeting 15% reduction in fuel usage by 2020 • Includes Technology/Hardware and Operational/Behavioral Initiatives • Part of Maritime Working Group in OPNAV N45 Task Force Energy | <ul style="list-style-type: none"> • Shipboard Energy Efficiency Management Plan (SEEMP) • Energy Training module in development to be integrated into existing CMEO Training • MSC Energy Awards and Recognition Program |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

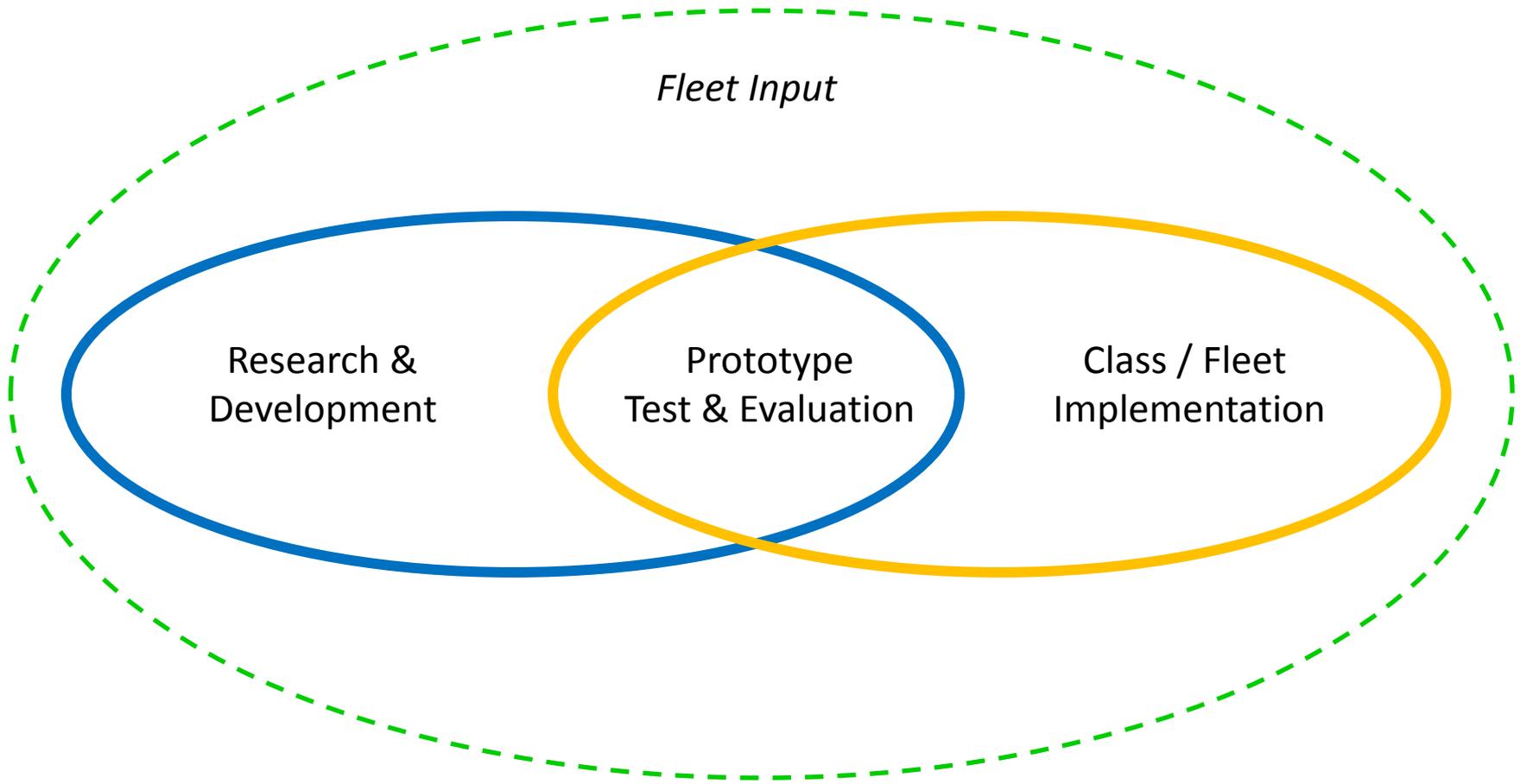
UNCLAS

Military Sealift Command

Mission-focused... Value-driven



MSC Energy Conservation Organization

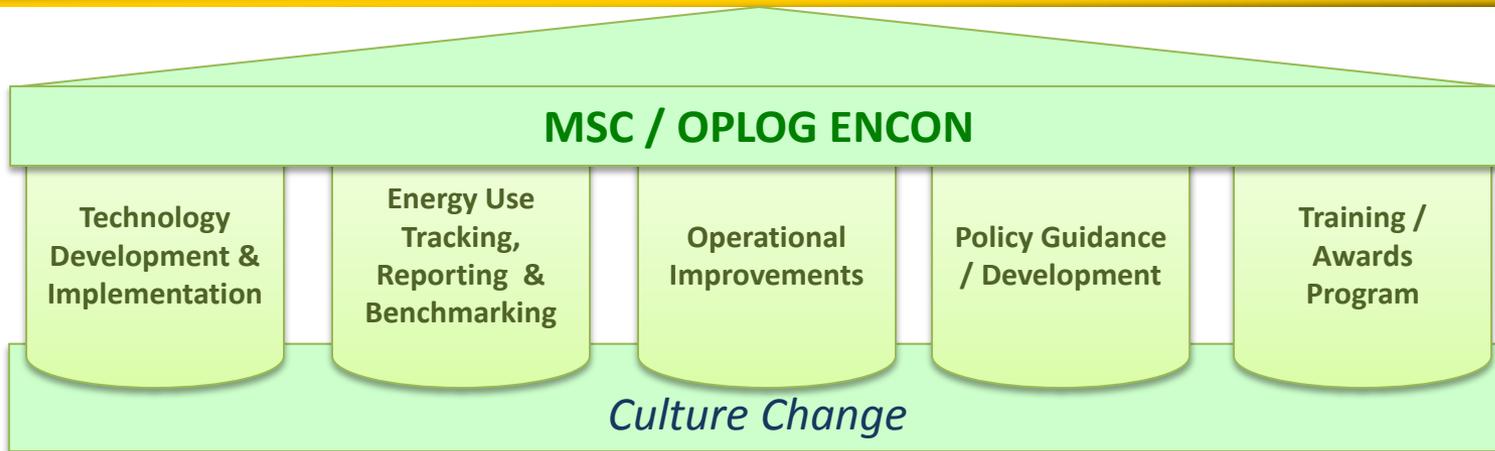


-  NSWC CD OPLOG ENCON R&D
-  MSC N726 Energy Resource Branch

UNCLAS



ENCON 5 Pillars



50% Effort
30% Savings

30% Effort
No Direct Savings

20% Effort
70% Savings

Enablers:

- Shore Power Meters
- Fuel Meters
- Energy Dashboard

Energy Savings Initiatives

- Intelligent HVAC
- Propeller Boss Cap Fins
- Boiler Improvements
- Lighting Upgrades
- Adjustable Speed Drives

- Audits/Ship Visits
- Baselining
- Metrics
- TFE/NECO Reporting
- Calibrated Baseline Model

- HT/FW Op. Ins.
- Engine Line Up Optimization
- Navigation Officer's Voyage Assistant
- Replenishment At-Sea Planner
- Retro-Comx
- Trim Opt.
- Optimal Speed Guidance

- COMSC Ins. 4101.1
- MSC ENCON Committee
- ECC-ECM Dev. Process Guide
- Behavioral ECC Dev. & Eval. EWI
- Ship Energy Efficiency Management Plan (SEEMP)
- ECC Sub. Form

- MSC ENCON Training
- SECNAV Energy Awards
- MSC Energy Awards & Recog. Program



MSC Culture Change

- **Ship Energy Efficiency Management Plan (SEEMP):** establishes a management framework for continuously improving efficiency of shipboard operating procedures

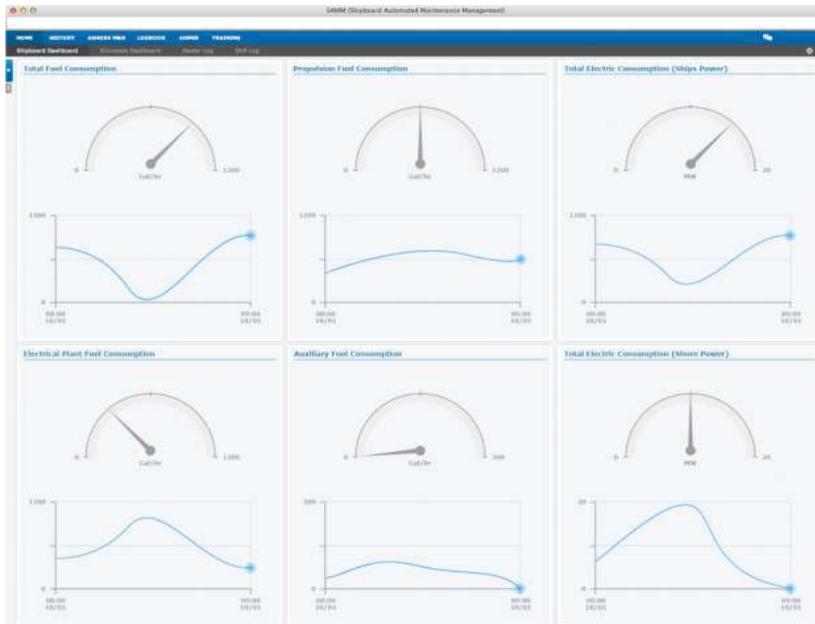


Operational initiatives cost much less and take less time to implement than hardware initiatives

- **Improvement depends on active engagement of Civilian Mariners (CIVMARs):**
 - **Suggestions of Energy Conservation Concepts (ECCs)**
 - **Energy-conscious operating choices**
 - **Attention to details (maintenance, settings, attitude)**
- **Supported by Energy Training**



Culture Change Enabler: Energy Management Dashboard



More Accurately Assess Shipboard Energy Conservation Underway and In Port

- Fuel meter and shore power meter inputs
- Real time fuel consumption data (MDG, Auxiliaries)
- Electrical power consumption (ship generated, shore power)
- Customizable display and data plots
- Resident in Shipboard Automated Maintenance Management (SAMM); non-live version viewable from any location
- Reduction in crew's manual reporting requirements

UNCLAS



Energy: Changing the Mindset



- ***Emphasis on lower cost operational type initiatives will be required in the future as budgets continue to decline, preventing higher cost technology improvements***
- ***Culture Change needs to happen at all levels***
- ***Proven operational initiatives need to be required to realize actual savings***
- ***No more low hanging fruit? Will need to take on some risk for larger gains and will need the endorsement of top level management***
- ***Operating manuals and guidelines need to be revisited with an energy focus***
- ***Energy needs to be a part of individuals' performance reviews***

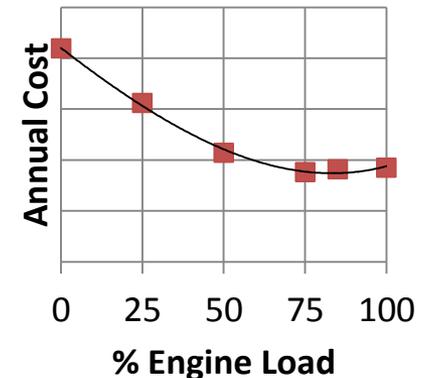


MSC Energy Training

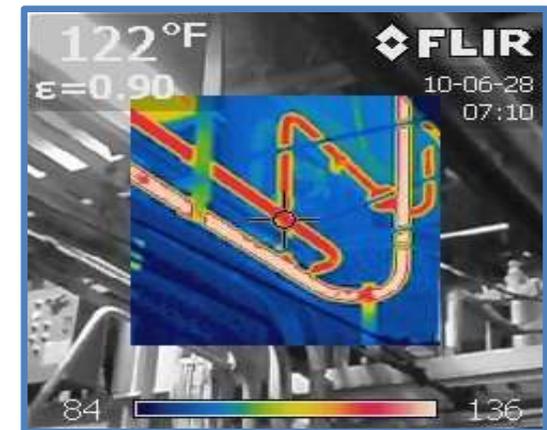


- *Two-hour intensive session focused on improving on-board operating practices for better efficiency*
- *Direct, hands-on examples:*
 - *Engine Loading, HVAC, Air Compressors, Engine Cooling and Preheating, Lighting, Vessel Speed, Underwater Hull, Shore Power, and Securing Equipment*
- *Emphasis on both reduced consumption and reduced cost*
- *Four versions: Senior Engineers, Junior Engineers, Senior Deck Officers, and Shoreside Support Staff*
- *On-site ship's crew training to be added*

Optimal Engine Loading



Jacket Water Preheating



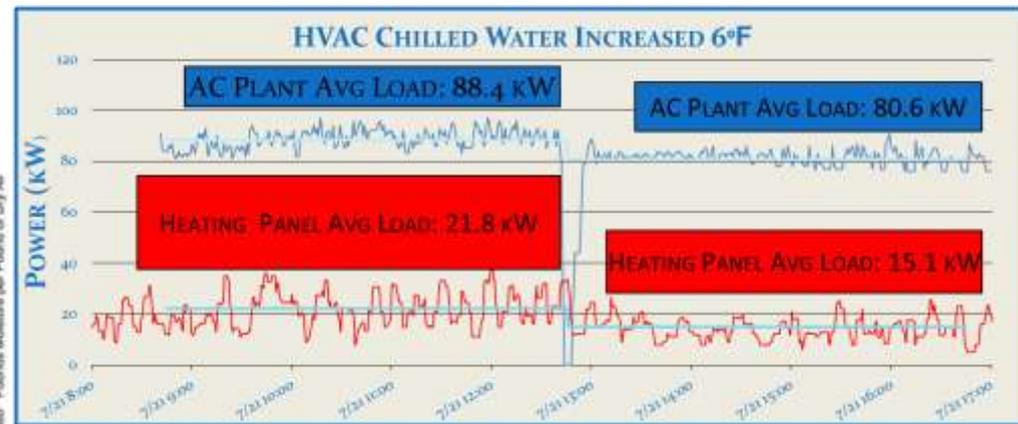
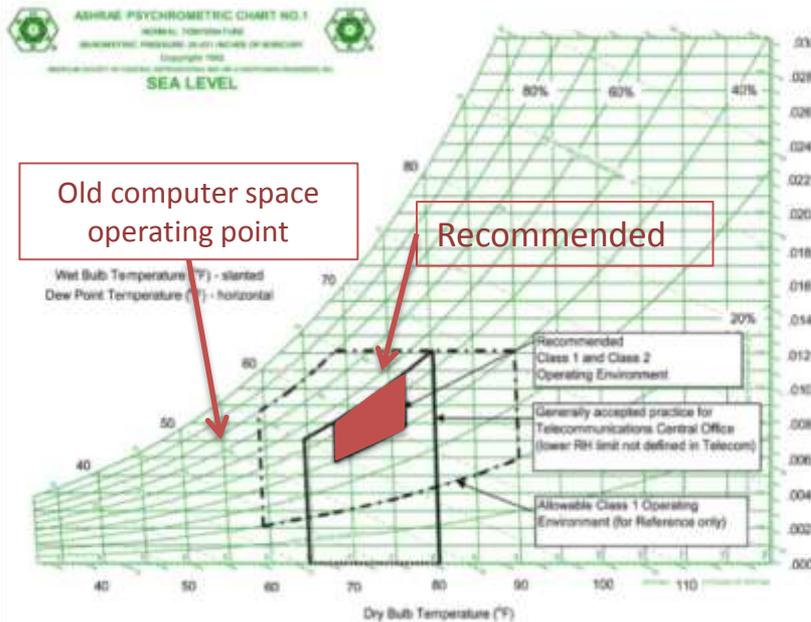


Training/Retro-Commissioning Example



Chill Water System:

- **Centralized chill water system temperature was set low, between 36°F and 44°F, to enable keeping Radio Room and Cargo Control Room (computer spaces) cooled (observed down to 50°F)**
- **Other habitability spaces then reheated to desired temperature**
- **ASHRAE actually recommends a higher air temperature envelope for data centers (see chart)**
- **Allows for higher chill water temp setting (chill water reset)**



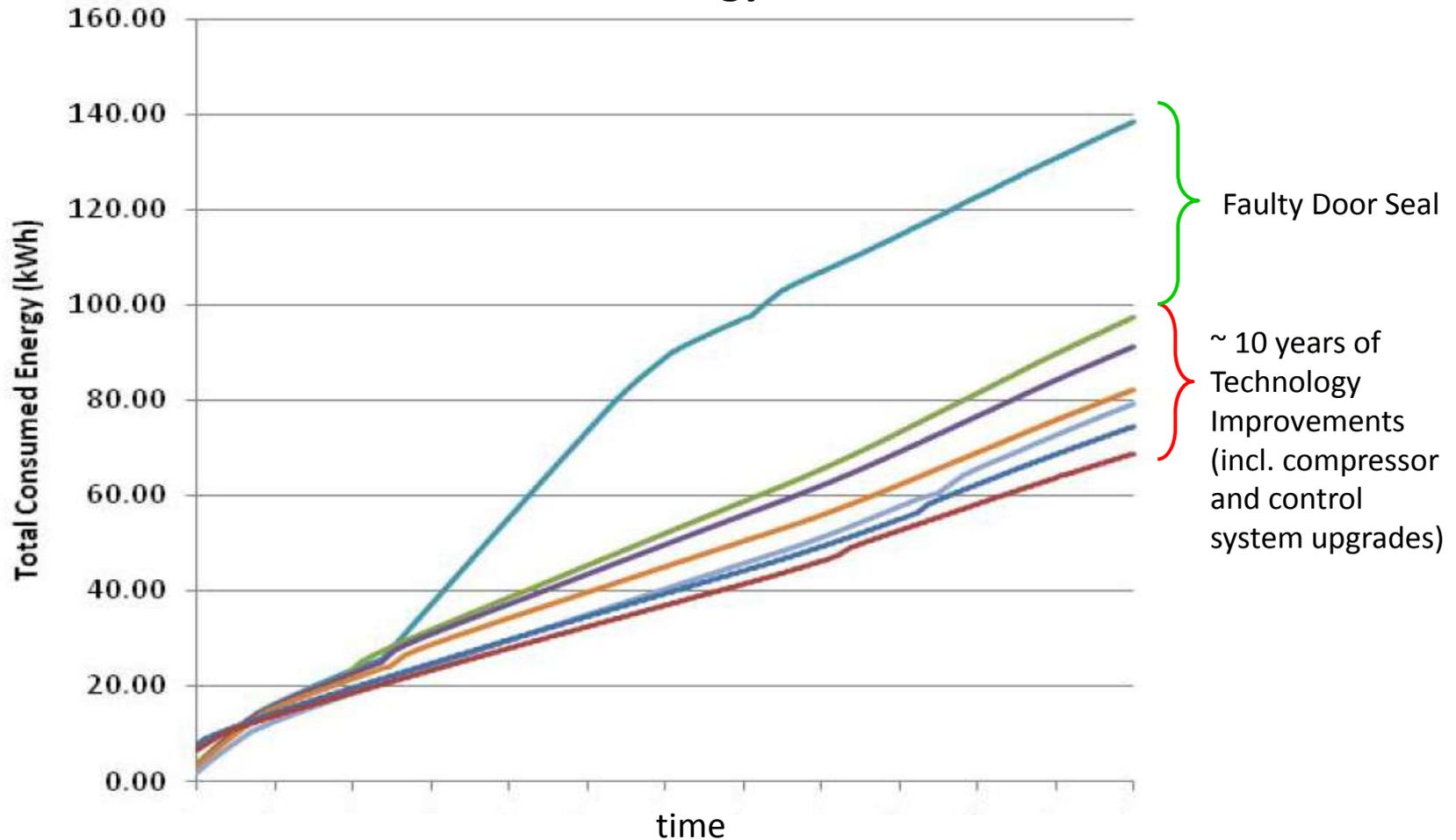
Total estimated energy savings from reduced load on chiller compressors and reduced reheating demand: **\$42,650 per ship, per year**



Maintenance vs. Technology



Refrigerated Containers Cumulative Energy – 24 Hours





MSC ENCON Summary



- ***Behavioral/Culture change is a major factor of the 5 pillar approach to MSC's Energy Conservation Program***
- ***It is possible to reduce energy cost and improve operational capability***
 - ***Longer range, more days on station, reduced maintenance, reduced frequency of refueling***

You Make a Difference

- ***Support SECNAV, CNO, USFF and COMSC Energy Goals***
- ***Culture Change = minimal investment for maximum savings***
- ***Get educated, provide input & challenge the status quo***

