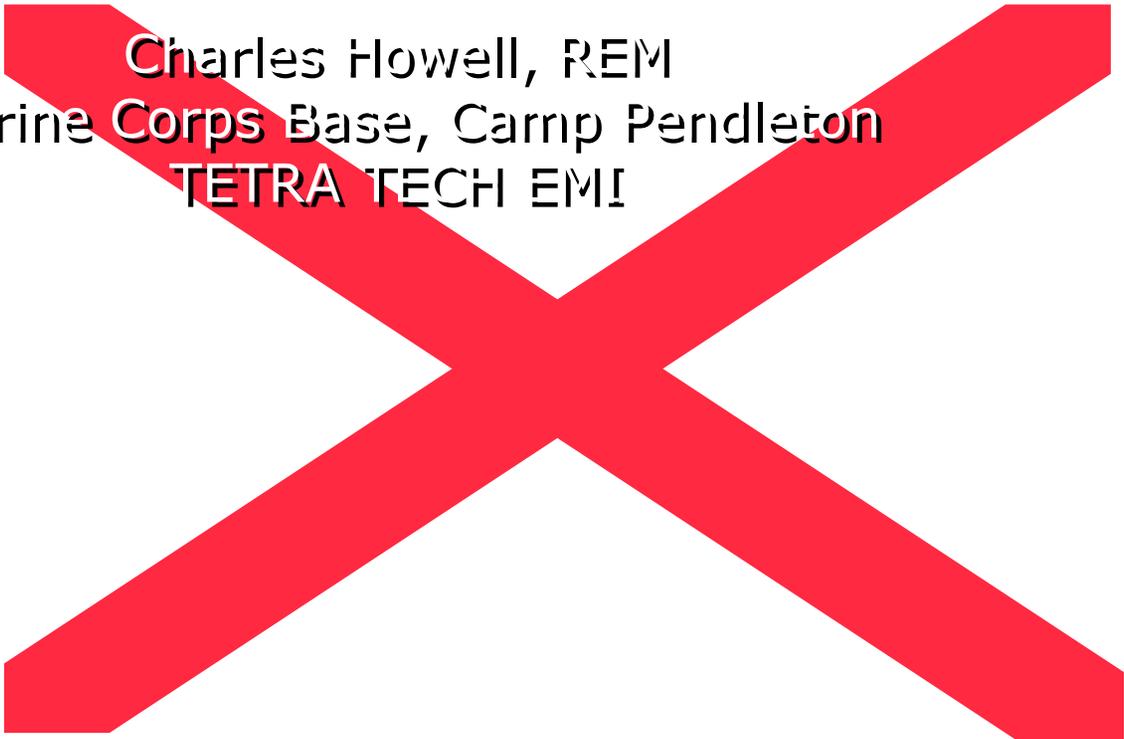
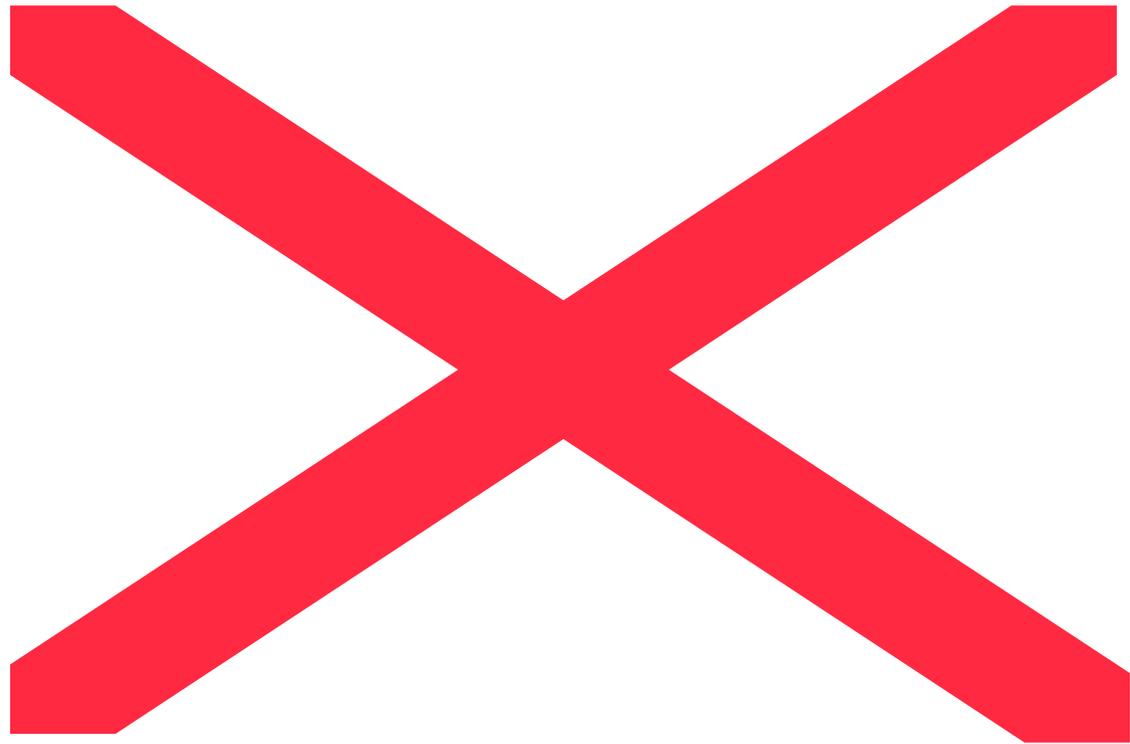


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# Operational Efficiency Implementation The REM Solution

Charles Howell, REM  
Marine Corps Base, Camp Pendleton  
TETRA TECH EMI









Under the  
Hood:  
Operations  
and  
Maintenance

- Fort Lewis/Army
- Navy Region NW
- Navy Region SW
- MCPCP
- Navy Region Mid-Atlantic
- Hawaii/Pacific Rim
- Coast Guard
- Post Office
- FAA



# REM Duties

- Awareness/Training
  - Develop Energy Policy
  - Site Visits
  - Inspections
  - Training (BEM – other)
  - Education
  - Energy Awareness Month Activities
  - Newsletters, Videos, Promotional Activities
  - O & M Collaboration

- Technologies
  - Renewable Energy
  - Solar Thermal
  - Condensing Boilers
  - Lighting (LED, Solar, Super T8)
  - Daylight Technology
  - Fuel Cells
  - Waste to Energy
  - Solar Wall
  - Building Controls



# REM Duties

- Measurement/Reporting
  - Energy Accounting Software
  - Scorecard
  - Metering
  - RADDs Reporting
  - Monthly/Quarterly/Reports
  - Project Savings



# REM Duties

- Project Development
  - Site Surveys
  - ECIP Submittals
  - ESPC and UESC Project Development
  - Research/Interviews
  - Customer Feedback



## Other Duties

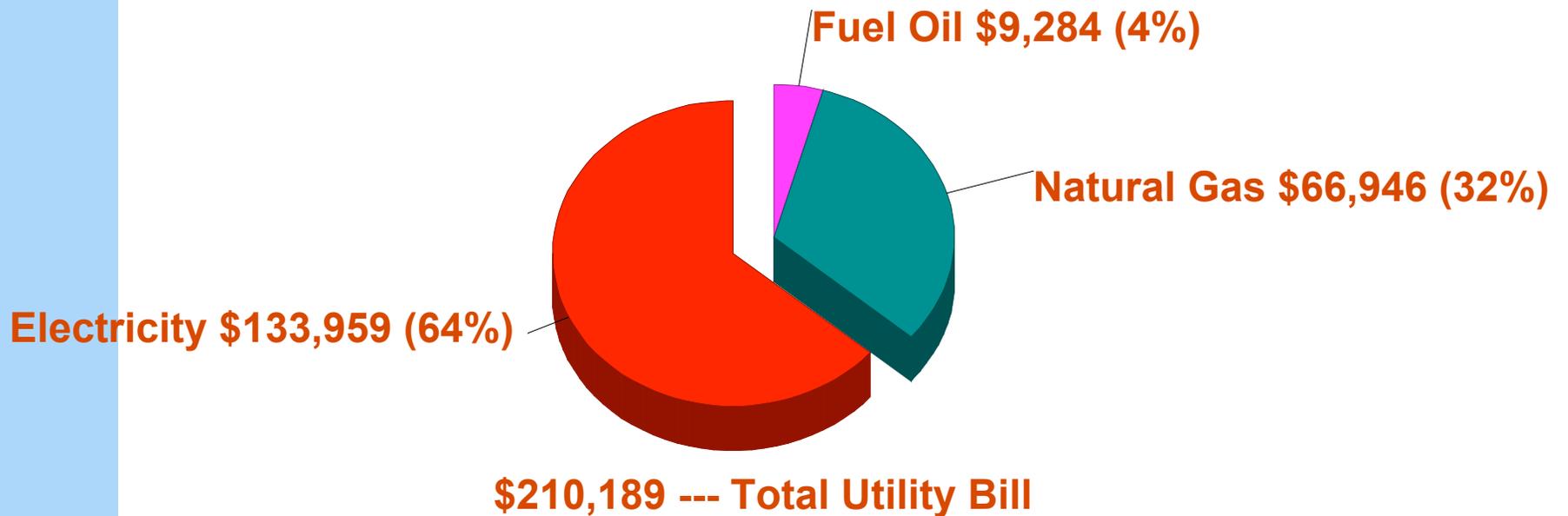
- Secure funding (OPM), Utility Rebates, State and Federal Grants, Pilot Projects, ESPC funding
- Coordinate with utilities
- Provide Sustainability support (Energy/LEED)
- Monitor DDC controlled buildings
- Provide recommendations



# Measure Everything

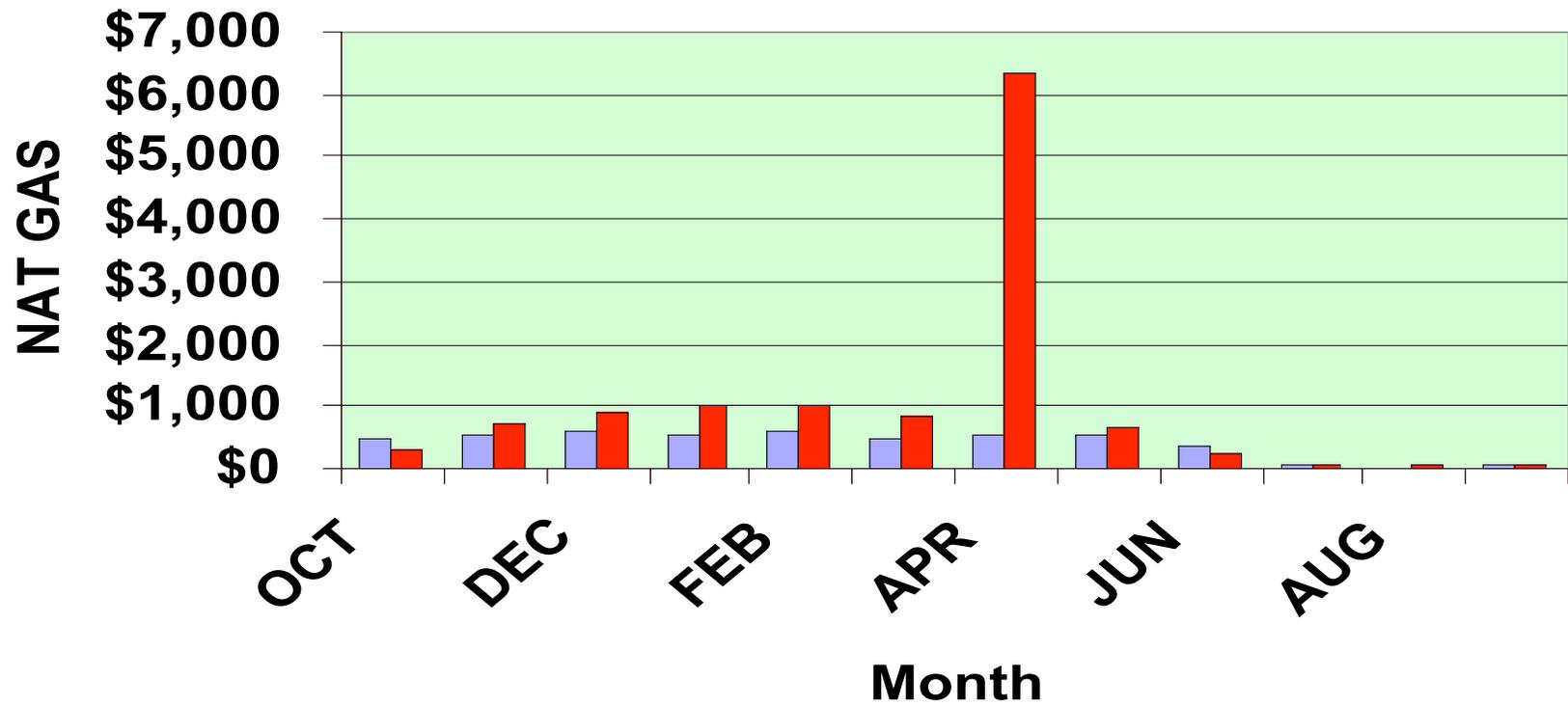
- You can't save what you can't...
- You can't put a plan in place without a baseline
- It's not too cheap to meter
- Reporting results require data

## Annual Total Utility Cost Breakdown

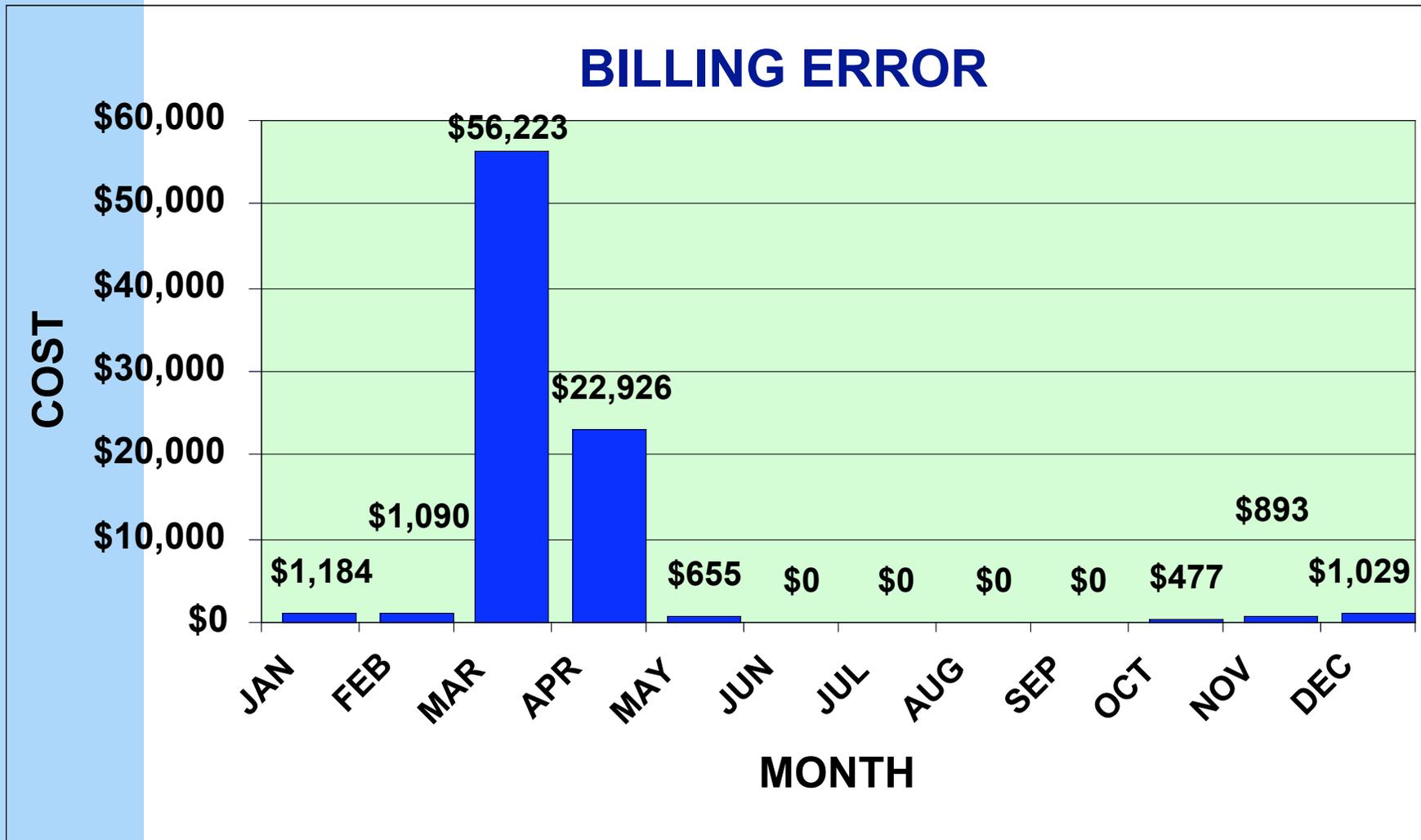


# Billing Error

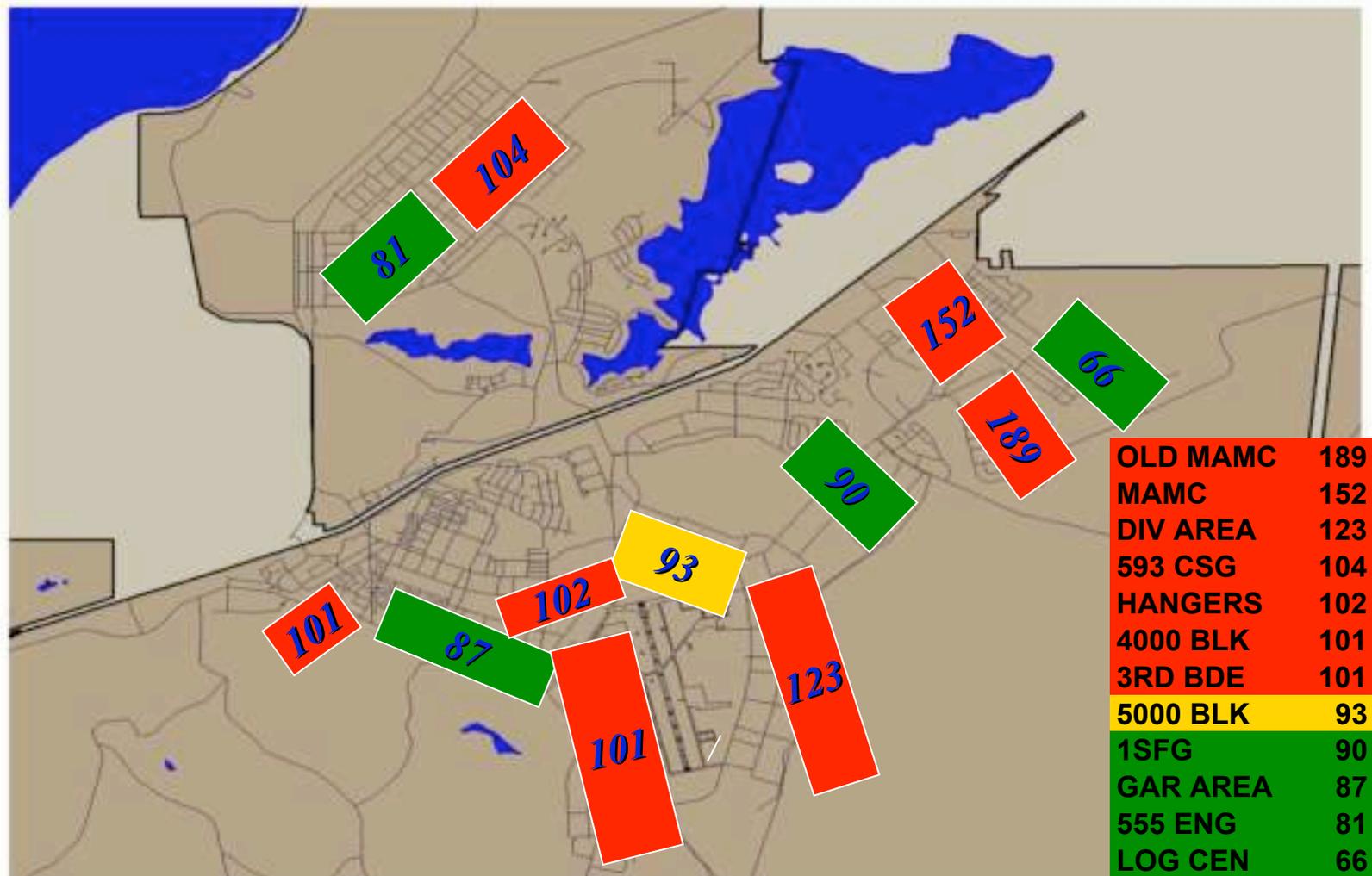
**Building 12737**



# Building 2003 (\$77K)



# Energy Use By Area But/SF





# Site Visits



 2006  
Energy

# Site Visits





# Site Visits





# Site Visits





**Hot Water Temp**

**110 - 120°F**

# 2006 Sustainability



- Native landscaping – rain water irrigation reduced potable water requirement
- Condensing boilers
- Low VOC paints and adhesives
- Daylight/lighting controls
- Current rainwater capture capability for summer irrigation and flushing over 1 million Gallons

- **More productive**
- **Has a better feel then fluorescent light**





# PV Systems





# REM Successes

- Fort Lewis > \$4 Million
  - Energy reduction – 19% (506,000 MMBTUs)
- Billing errors - \$250K
- Sec Army Energy Awards (99, 03, 05)
- DOE, Energy Management Awards (00, 02, 05)
- Sustainable Projects