

# Charting a Course to Energy Independence

Providence, RI  
August 9-12, 2009





# Hill Air Force Base



**TEAM  
HILL**  
*America's Best!*

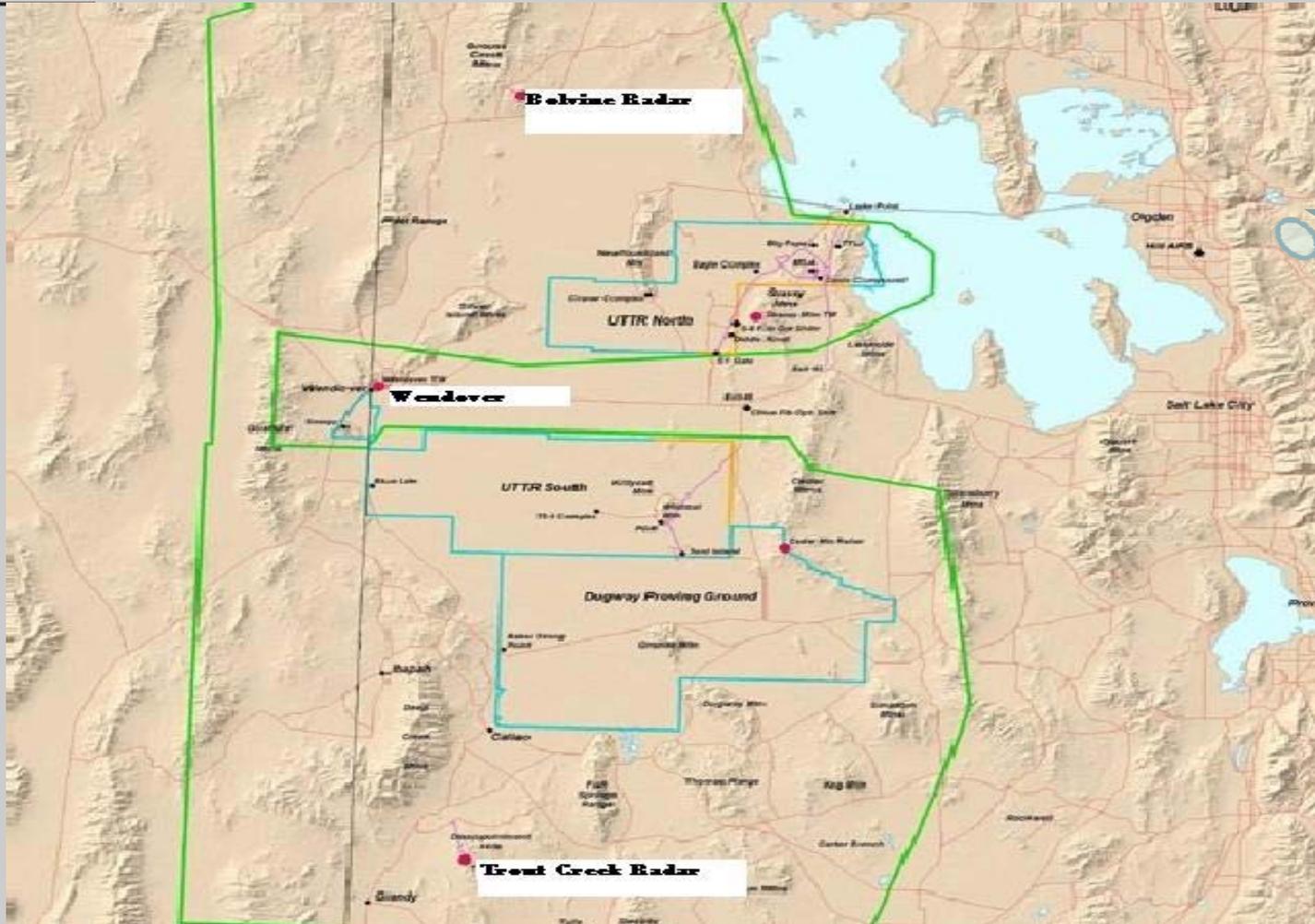


# Hill Air Force Base Mission

- Responsible for World-Wide Engineering and Logistics Management Support to Include Depot Maintenance Work
  - F-16 Fighting Falcon
  - C-130 Hercules
  - A-10 Thunderbolt
  - Minuteman III Intercontinental Ballistic Missile (ICBM)



# HILL AFB & RANGE





# ENERGY USE STATISTICS

- Annual Energy Usage/Cost
  - 250,000 MWH / year - \$10 million
  - 1.3 million DTH / year – \$9.0 Million
  - 442,000 klbs of purchased steam - \$3 million
  - Total Energy - 2.7 million MBTU's
- \$22+ Million Dollar Annual Budget

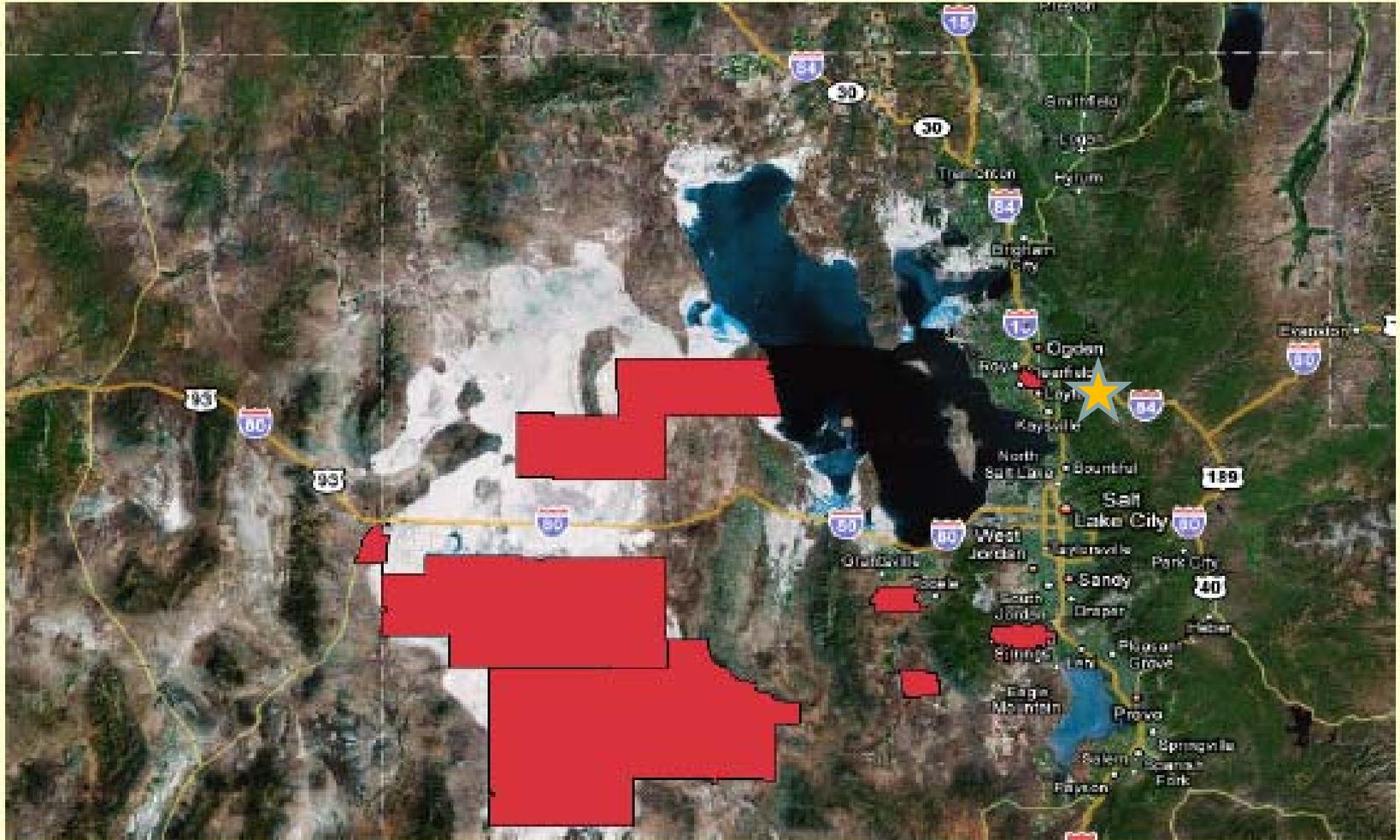


# Renewable Energy Projects Overview

- DOD in Utah
- RDF
- LANDFILL GAS
- PV
- REC'S
- GROUND SOURCE HEAT PUMPS
- FUTURE PROJECTS



# DOD in Utah





# Energy Recovery Facility

- Facility constructed/commissioned in 1986 w/Hill AFB as only customer
- Contract renewal every 5 years
- Estimated savings of \$990,000 annually
- All purchased steam classified as thermal renewable energy





# Energy Recovery Facility

- Motivation
  - Good neighbor
  - Inexpensive thermal energy
- Challenges
  - Contract and the price basis
  - Delivery of steam to end users



# Landfill Gas to Energy

- “First” DoD/AF Project Under Biomass Alternative Methane Fuel (BAMF) ESPC and “first” in USAF and state of Utah
- Benefits
  - Clean, Renewable Energy source
  - Guaranteed – low cost electricity
  - Contributes 2.4% to Renewable Energy goals
  - Reduced air emissions –vs- conventional generation





# Landfill Gas to Energy



- Challenges:

- Partnership with USAF, Local Government, and AMERESCO Federal Solution
  - 2.5 mile pipeline
- Location





# LFG Generation Facility

- Motivation
- Three Internal Combustion Generators
  - First 3 years of operation produced 21.6 million kwh
  - Saving \$1.06 M in purchased electrical cost
  - Increased plant capacity to 2.3 MW in 2008





# Photo Voltaic Array

- 210 KW Ground Mounted Stationary Array
- Challenges
  - First Cost
  - Siting
    - Ground vs Roof
  - Aircraft Operations
    - Reflection
  - IA



# Photovoltaic Array

- Motivation
  - 210 KW
  - 380,000 kwh / year





# Renewable Energy Certificates

- Participation in Rocky Mountain Power's Blue Sky<sup>SM</sup>
  - 750,000 kwh/month or 9 million kwh/yr => 3.6% of annual electrical consumption
  - Hill AFB is the largest single participant in the Rocky Mountain service region
- Challenges
  - Convincing leadership that benefit was worth the price premium
- Motivation
  - Most cost effective way to augment RE portfolio
  - Offered significant local/state/federal recognition

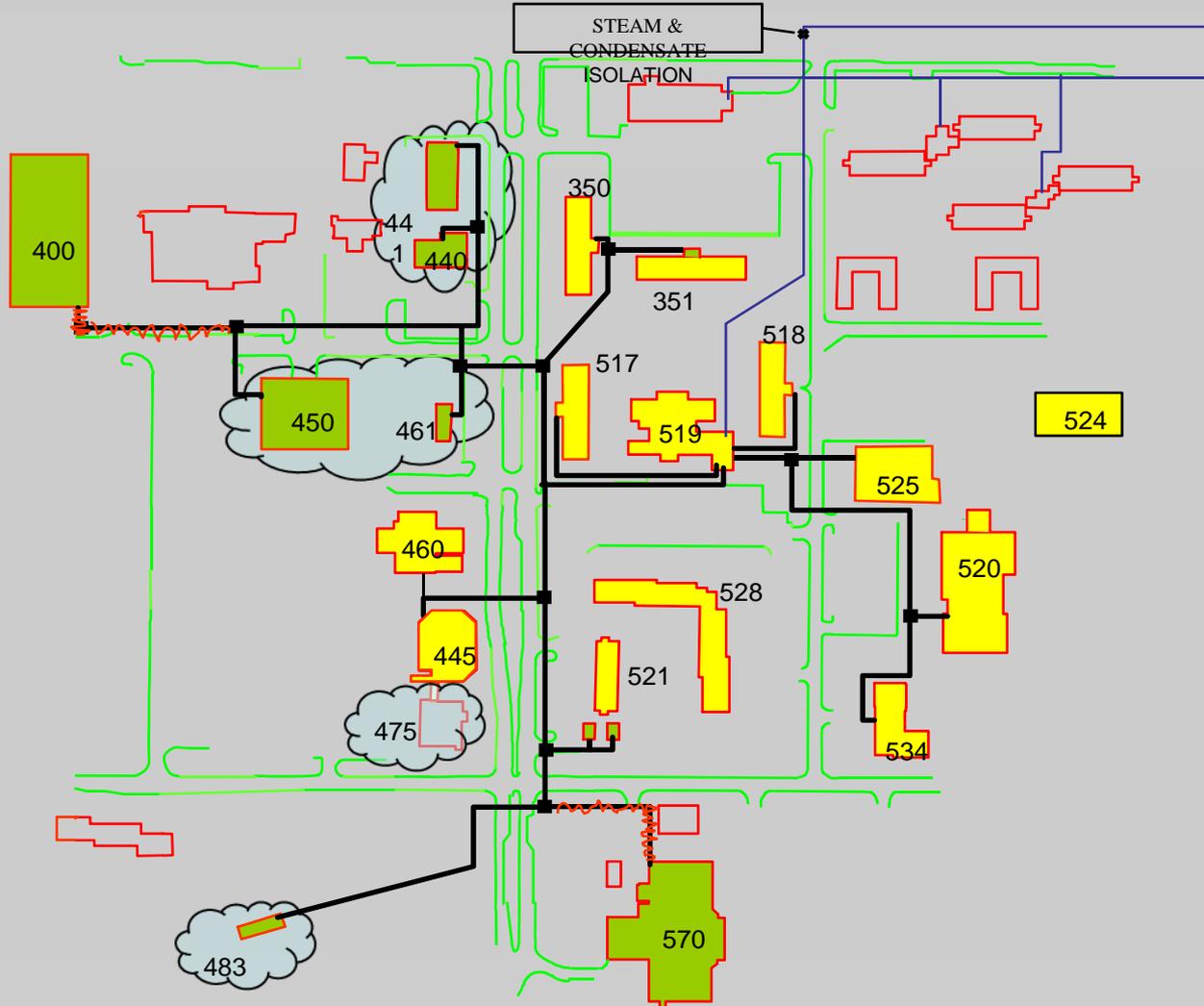


# Geothermal Heat Pumps

- Challenges
  - Low energy cost and high construction cost vs savings
- Motivation
  - Reduce demand on steam plant by 8%
  - Eliminates steam requirement in non-heating months
  - Eliminates year-around maintenance on steam and condensate lines in the area



# Geothermal Heat Pumps





# HILL AFB ENERGY FORUM

- Day long workshop sponsored by OO-ALC/XP 22 Apr 09
  - Hill AFB Stakeholders
  - Technical Experts
    - State of Utah
    - Air Force
    - PacifiCorp
    - Higher Education
  - Workshops to establish Integrated Process Teams to evaluate technologies that could be used to make Hill AFB “Energy Neutral”
- Agenda
  - Air Force Energy Strategy Overview
  - State of Energy in Utah and the Intermountain West
  - Working Group Sessions
    - Solar
    - Wind
    - Geothermal
    - Biomass
    - Nuclear
    - Integrative: Innovative Finance, Regulations, Law and Policy



# QUESTIONS?