

Resilient at the Installation

Chuck Witta, PE
Deputy Public Works Officer

19 June 2017

- **Navy's Plan for Resiliency**
- **Renewable Energy**
- **Local Challenges**

Power Matters for the Warfighter



The Department of Defense “should explore alternate and renewable energy sources that are reliable, cost effective, and can relieve the dependence of deployed forces on vulnerable fuel supply chains. ...The purpose of such efforts should be to increase the readiness and reach of our forces.”

- Secretary of Defense
James Mattis

DoD/DON Shore Energy Consumption



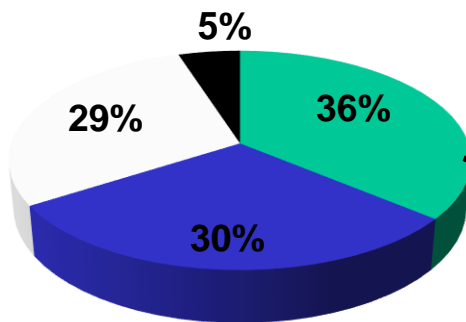
**211,095 B
BTUs**

of installation
energy
consumed by
DoD in FY15

30%

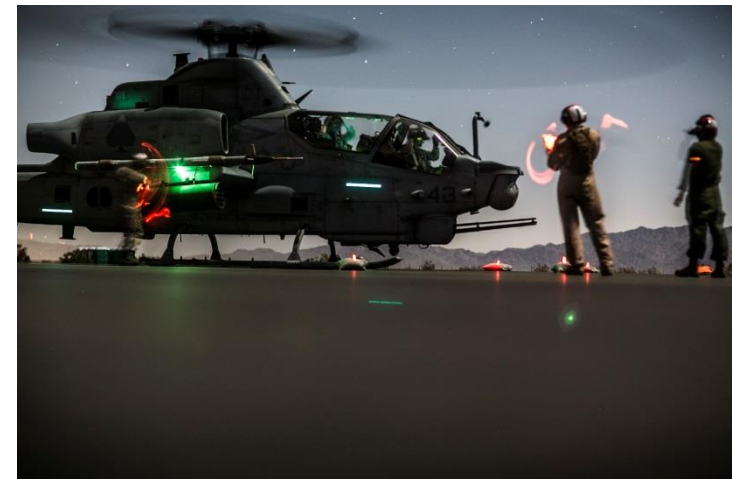
of total DoD
energy
consumption
attributable
to
installations

DoD FY15 Installation
Energy Consumption



29%
of DoD's
installation
energy
consumption
attributable to
DON

□ DON ■ Air Force
■ Army ■ Defense Agencies



Three Pillars of Energy Security



Energy Security

Reliability

The percentage of time energy delivery systems (utilities) can serve customers at acceptable regulatory standards.

Resiliency

The ability of a system to anticipate, resist, absorb, respond, adapt, and recover from a disturbance.

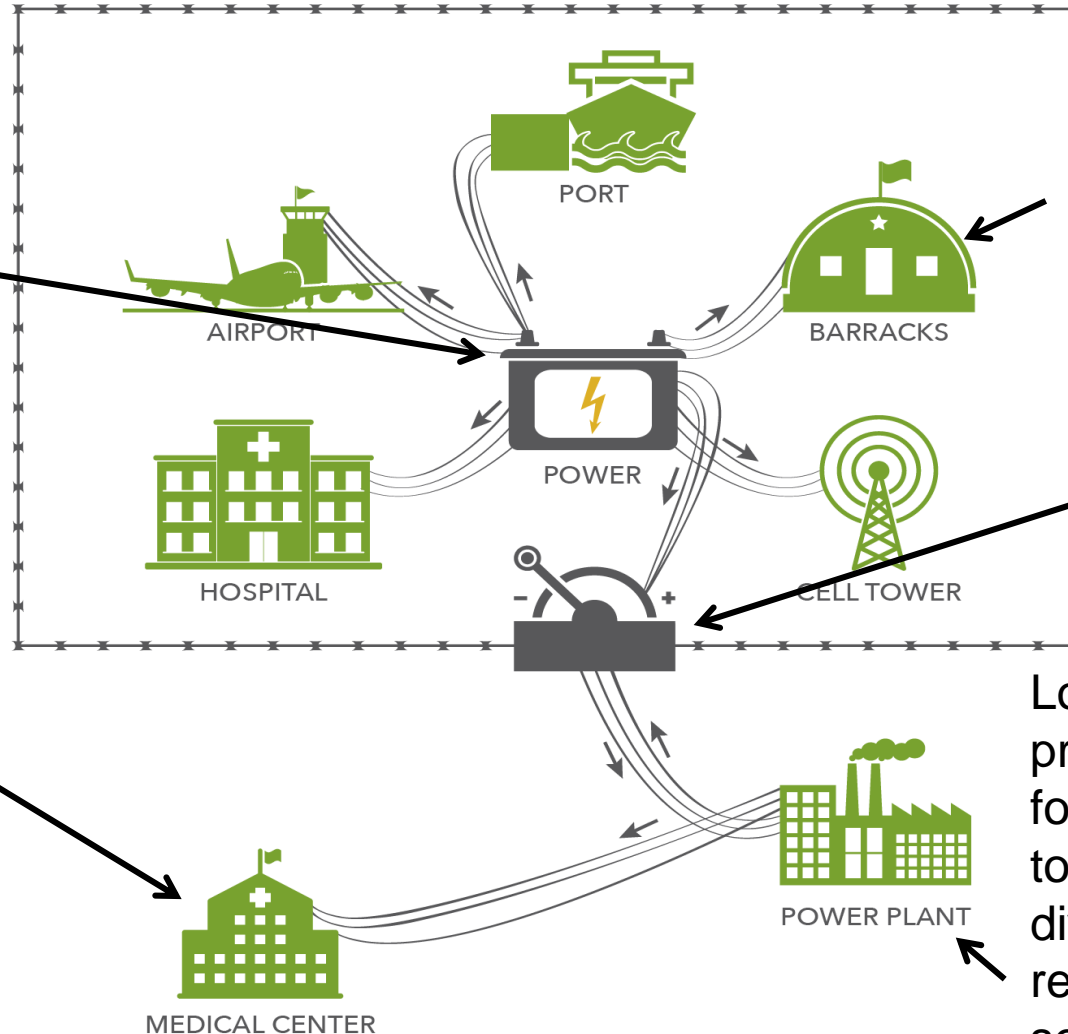
Efficiency

The use of the minimal energy required to achieve the desired level of service.

Holistic Energy Approach



Critical assets
powered by
dedicated base
energy sources



ESPCs make
buildings more
energy efficient and
enable long-term
cost savings

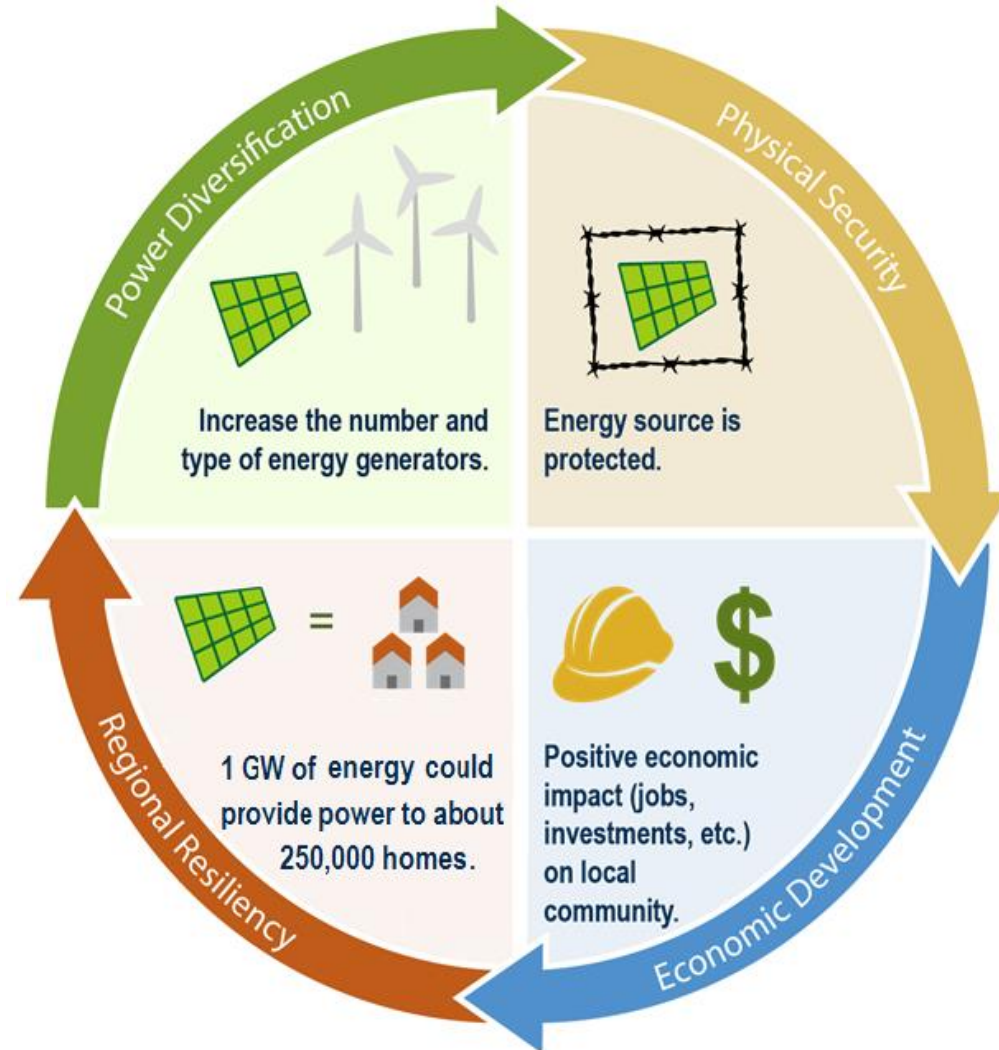
Islanding microgrid
capabilities

Potential
community
microgrid
capabilities

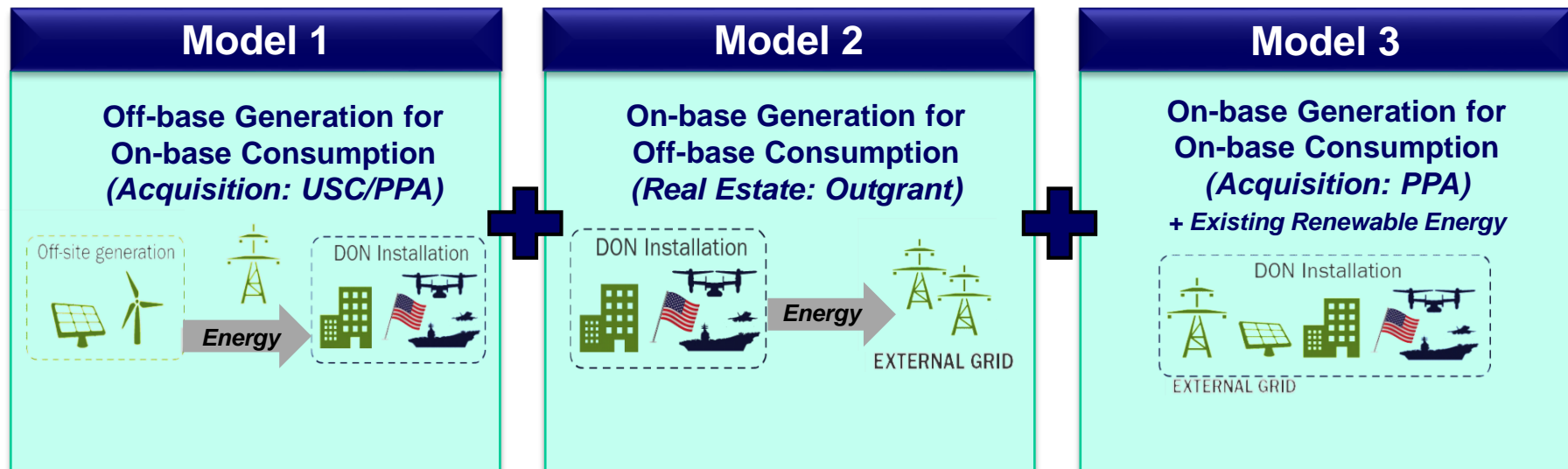
Long-term PPAs can
provide cost stability
for the DON and help
to incentivize the
diversification of
regional energy
sources

Renewable Generation for Resiliency

- Deploying new renewable energy generation will enhance the DON's energy security posture:
- Long-term contracts for RE at a set price provides cost-stability
- Power diversification to increase the availability of local energy sources
- Locating facilities on-base to provide physical security
- Collaborating with local communities to provide regional resilience



•Third-party Financing (the 1 GW Models)



•Energy Savings Performance Contracts (ESPCs)

•Utility Energy Savings Contracts (UESCs)

ENERGY PROJECTS

Grid-scale Battery and PV at NWS Seal Beach



- **50-100 MW grid scale battery system at NWS Seal Beach**
- **Benefits:**
 - The project will increase reliability and security of the local California grid
 - The DON will receive a 500kW PV system and 1MW, 6MWh battery exclusively for Navy use
 - The system will providing power to critical loads during grid outages



Solar and Battery Storage at NB Ventura County



An approximately 7 MW solar system and 6 MW, 18 MWh battery system on the local grid

- Cutting edge battery system
 - Extremely high energy density
 - Long life-span
 - 100% recyclability
 - Long and short term generation asset
- The project will provide both the DON and Ventura County community with energy resiliency and storage reliability
- The system can cover over 65% of the base's peak loads for hours at a time



Microgrid at MCAS Yuma



The DON and Arizona Public Service are building a 25 megawatt microgrid system on base which will automatically provide power to the base during commercial outages.

- This partnership creates the first base in the U.S. to have 100-percent backup power
- APS will utilize the generators during periods of peak demand



- **\$67M, 4-in-1 solution combining cogeneration, chillers, a photovoltaic array and direct digital controls (DDCs) to form their own micro-grid (awarded in 2002)**
 - Saves 63,176 MWH/year (equivalent to powering Austria or Greece)
 - Electricity bill reduced by \$5.8 million/year
 - Huge reductions in greenhouse gases and other potentially harmful emissions damaging to our environment



- Ongoing project which began as a MCON project: ~\$91M
- Capital Investment: \$70M
- Annual Estimated Cost Savings: \$5M
- Total Energy Savings: 321,115 (MMBTU/yr)



- **Net zero installation (Electricity) through biomass steam turbine generator**
- **Capital Investment: \$47M**
- **Annual Estimated Cost Savings: \$5M**
- **Total Energy Savings: 157,000 (MMBTU/yr)**
- **Sell excess electricity to Georgia Power**



LOCAL CHALLENGES

- **Solar**
- **Wind**
- **Geothermal**
- **Biomass**
- **Energy Storage**
- **Hydropower**

- **Solar**

- Open Space
- ROI



- **Wind**

- ROI

- Planes and Turbines don't mix too well

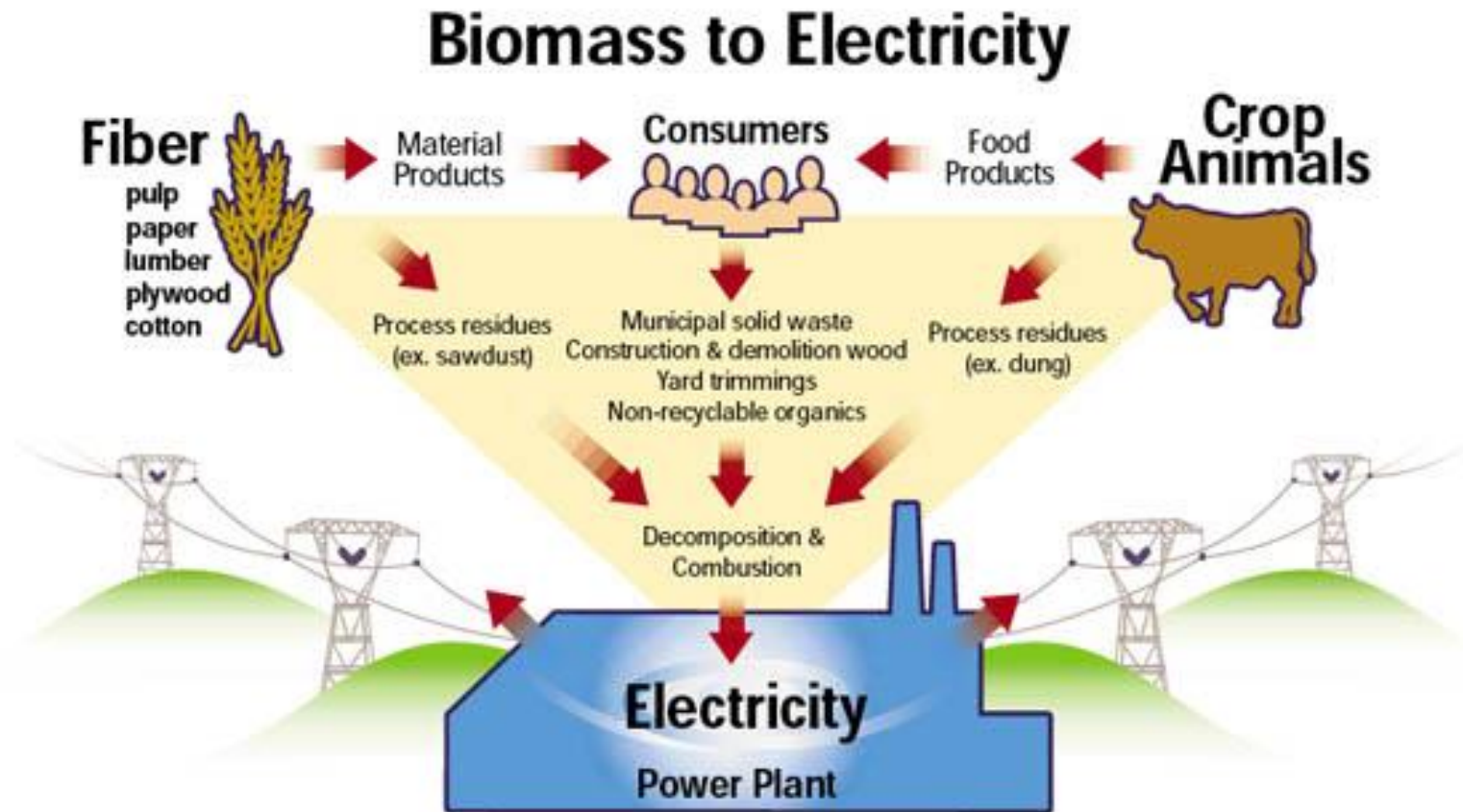


- **Geothermal**
 - Not viable in Fort Worth area



- **Biomass**

- Not viable in Fort Worth area



- **Grid Energy Storage**
 - No renewables to store



- **Hydropower**
 - Lake Worth & Trinity River (HmMMM)



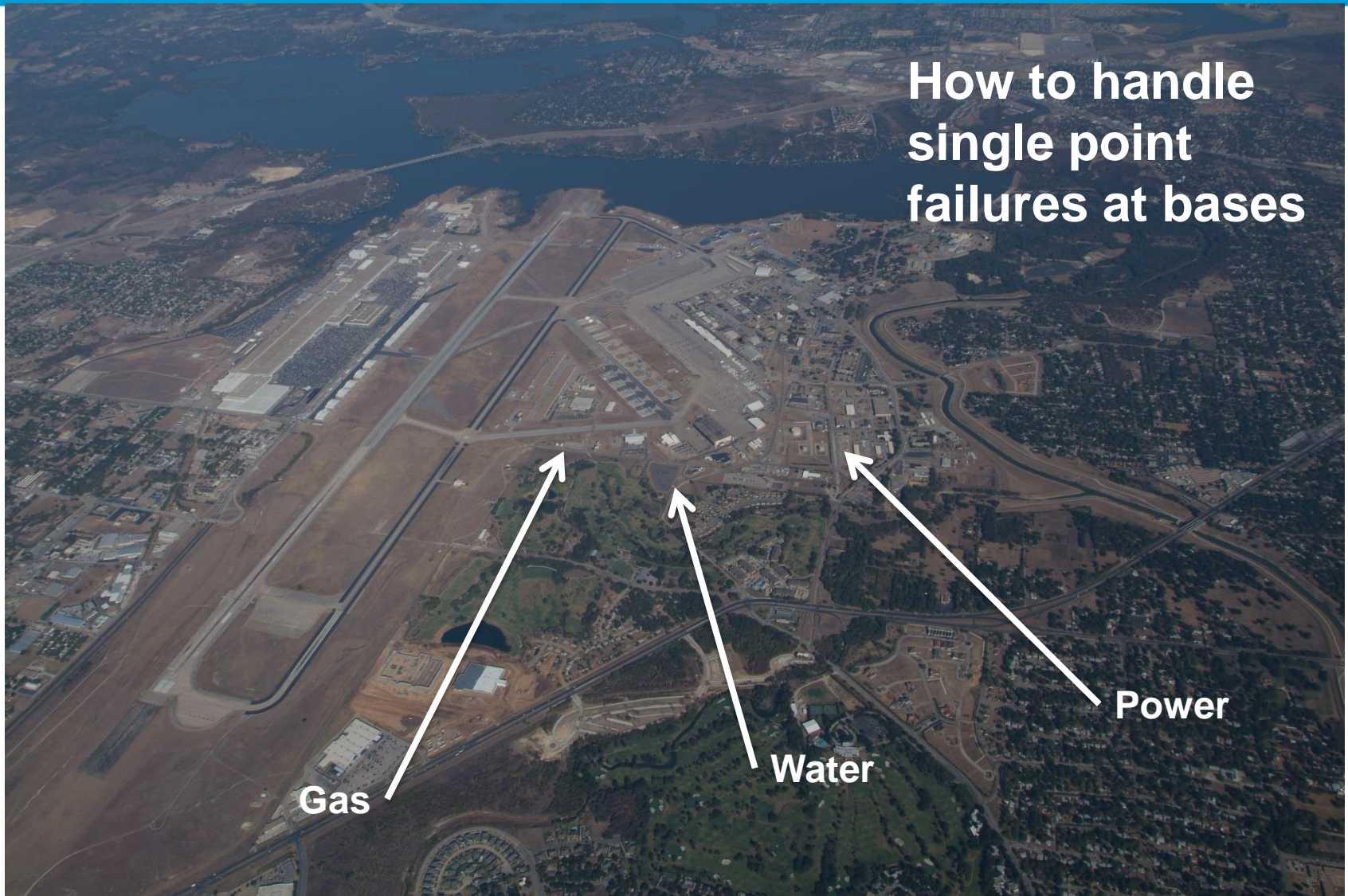
- The common challenge facing NAS Fort Worth for any renewable energy project is the **Return on Investment**.
- Cost for electricity is much cheaper than other states and does not deliver the payback when competing for limited energy dollars



Utility Considerations



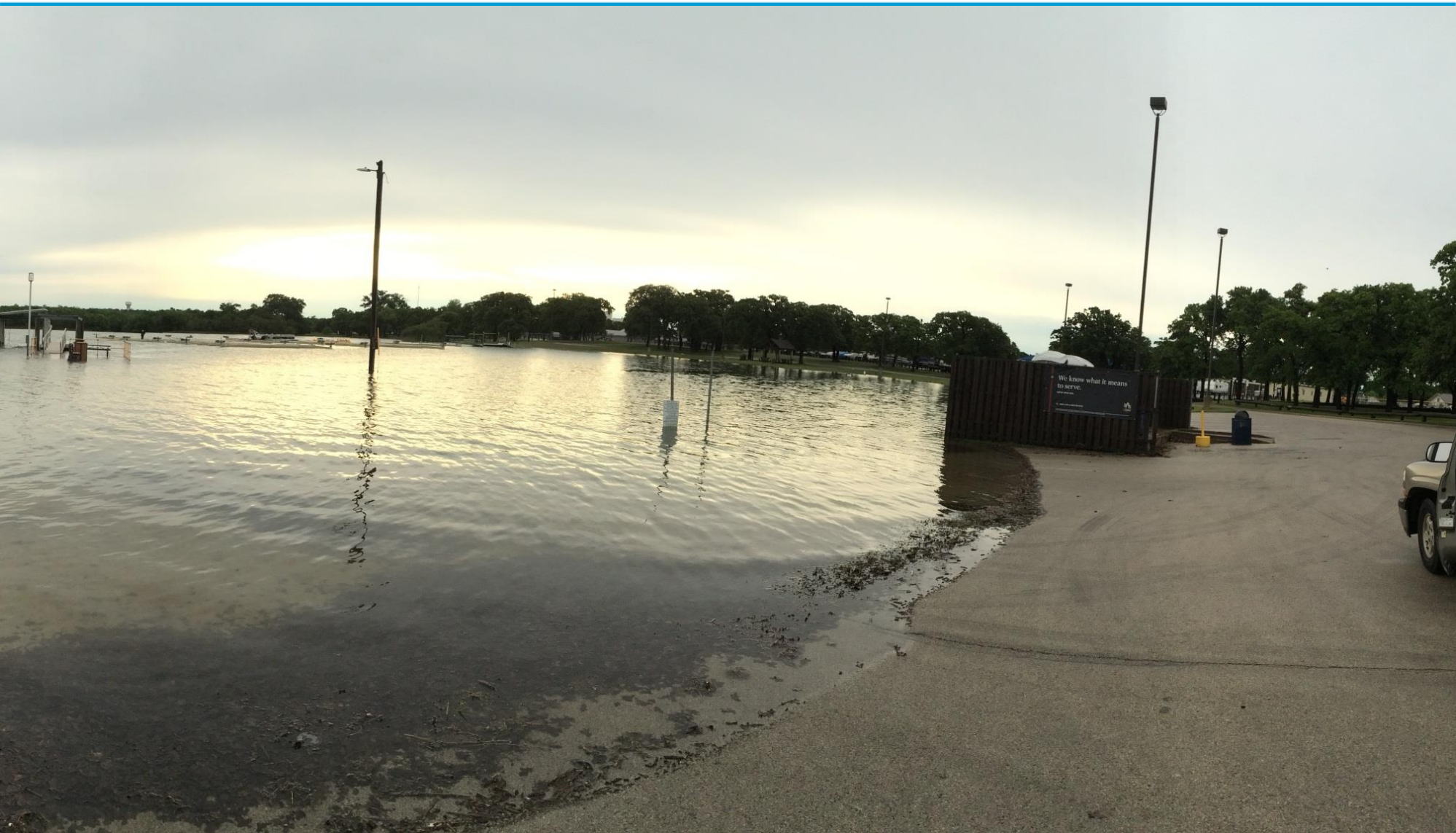
How to handle
single point
failures at bases



- **NAS Fort Worth is not concerned with Hurricanes to the same level as Navy Bases along the coast.**
- **Tornadoes, damaging wind and hail, are the most likely threat to facilities**
- **Recent flooding of Eagle Mountain Lake and Lake Worth raised the water level to its highest in 50 years, but no impact to base.**



Rising Waters





Rising Waters



- **Navy has strong goals for Resiliency in Energy at Navy/Marine Corps Bases**
- **These projects require significant funds to construct – funded up front or financed (ESPC)**
- **Competition for projects is strong**
- **Local regulations (Zoning/Environmental) must be followed**
- **Develop Plan and “Keep Fighting the Fight”**