Federal Bureau of Prison's ESPC – FCI Victorville

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Federal Bureau of Prison's ESPC – FCI Victorville

The Big Picture

Federal Bureau of Prison's ESPC – FCI Victorville

- ESPC – Will this program work in a prison?
- How do we sell and implement this program?
- Finding a Leader that wants to make a difference
- Educating Facilities Management / Institution staff on energy goals and mandates

Federal Bureau of Prison's ESPC – FCI Victorville

- FCI Victorville: ESPC Challenges
- New Institution, did the potential exist for this program?
- Inmate Labor / Inmate Labor Rates
- Wind, solar energy - is it cost effective?
- California Rebate Program, do we qualify, how much funding is available?

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- Team building, creative thinking made this project work
- Funding for unscheduled maintenance built in project payment stream
- Utilizing Institution Staff as eyes on the ground / first responder
- Educate staff on Energy Reduction & mandated goals, get them involved from the start

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- ECM 1, HVAC Upgrades, Converting from conventional constant volume to variable air flow, resulting in significant savings and maintaining heating / cooling requirements
- ECM 2, 750 kW Wind Turbine, First utility scale turbine under California's Self Generation Incentive Program
- ECM 3, 75 kW Photovoltaic Car Port System, Carport array will provide shaded parking

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- Renewable Energy: 75 kW Photovoltaic Carport Array

- Free covered parking and solar energy is a perfect fit for this institution located in the Mojave Desert

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- 750 kW Wind Turbine utilized existing data from the local airport
- Challenge: Overcoming height restrictions and approval from FAA
- First Cut Design: Duel Purpose Wind Turbine / Security Tower ???

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- Dual Purpose Wind Turbine ? Security Tower
  Design Disapproved
- Back to the Drawing Board
- Final Design: 750 kW Wind Turbine
- Wind Turbine Pictures / Installation of Similar Wind Turbines

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FCI Victorville

A Hybrid Renewable ESPC Success Story

Scott Debenham
NORESCO

FCI Victorville – California

Facility Type: Federal Prison
Facility Size: 2,000,000 sq.ft.
Type of Contract: DoE Western ESPC
Term of Contract: 19 years
Total Capital Cost: $5,947,862
Total Annual Savings: $420,589

Awarded Delivery Order:

- 750 kW Wind Turbine Installation
- 75 kW Solar Photovoltaic (PV) Covered Parking Structure
- HVAC and Controls System Upgrade

Future Delivery Order:

- Virtual Central Plant
- Controls System Integration

Overview of Project Economics

Energy Conservation Measures	Installation Cost	Annual Energy Savings
HVAC and Controls Upgrade	$1,800,000	$290,000
Wind Turbine (750 kW)	$2,800,000	$110,000
Solar Photovoltaic Array (66 kW)	$1,350,000	$20,000
Total Prior to State and Federal Subsidies	**$5,950,000**	**$420,000**

Rebates, Incentives and Grants

DOE Grant	$70,000
Utility SPC Rebates (kWh reduction)	$120,000
PUC Self Generation Incentive Program (SGIP)	$2,000,000
Total Subsidies	**$2,190,000**

Total Amount Financed **$3,760,000**

Aerial View of FCI Victorville

ECM 1 – HVAC/Controls Challenges and Solutions

- Challenge:
  - Prison Air Flow Levels and Changes Lead to Time Consuming Prisoner Complaints.
- Solution:
  - VFDs Ramp Down of Air Flow will be Smooth. Installed Air Flow Stations that are Remotely Monitored.
- Challenge:
  - Repair/Replacement Costs of VFDs.
- Solution:
  - 5-Year Extended Warranty on VFDs.
  - Self-Funded Repair and Replacement Account throughout Contract Term.

ECM 2 – 750 kW Wind Turbine Challenges and Solutions

- Challenge:
  - FAA Restrictions Limited Height and Location.
- Solution:
  - Evaluated 3 Locations to Optimize Turbine Power Output and Meet FAA Safety Requirements.
- Challenge:
  - Accurately Assessing the Wind Resource.
- Solution:
  - Installed 2 METs to Determine Optimal Location.
  - Assessment Confirmed Independently by a Private Meteorologist and NREL.
  - Agreed on TMY for Wind Resource.
- Challenge:
  - Turbine Performance and Availability
- Solution:
  - Used Independently Verified Performance Data Less Expected Degradation.
  - Availability Independently Estimated. Response Times Written Into Maintenance Subcontract.

ECM 2 – 750 kW Wind Turbine Challenges and Solutions

- Challenge:
  - Operational Costs for a Single Turbine
- Solution:
  - Scope of Operations Responsibilities Shared Between NORESCO and FCI Victorville
- Challenge:
  - Ensuring Long Term Savings Stream
- Solution:
  - 5-Year Extended Warranty on VFDs.
  - Self-Funded Repair and Replacement Account throughout Contract Term.

ECM 3 – 75 kW PV Carport Challenges and Solutions

- Challenge:
  - Maximize Incentives to Reduce Initial Capital Cost.
- Solution:
  - Knowledge of all Available Incentive Programs
- Challenge:
  - Best Use of Available Inmate Labor
- Solution:
  - Inmate Labor will be Used to Clean the Panels Over the Term of the Contract.

Victories At Victorville

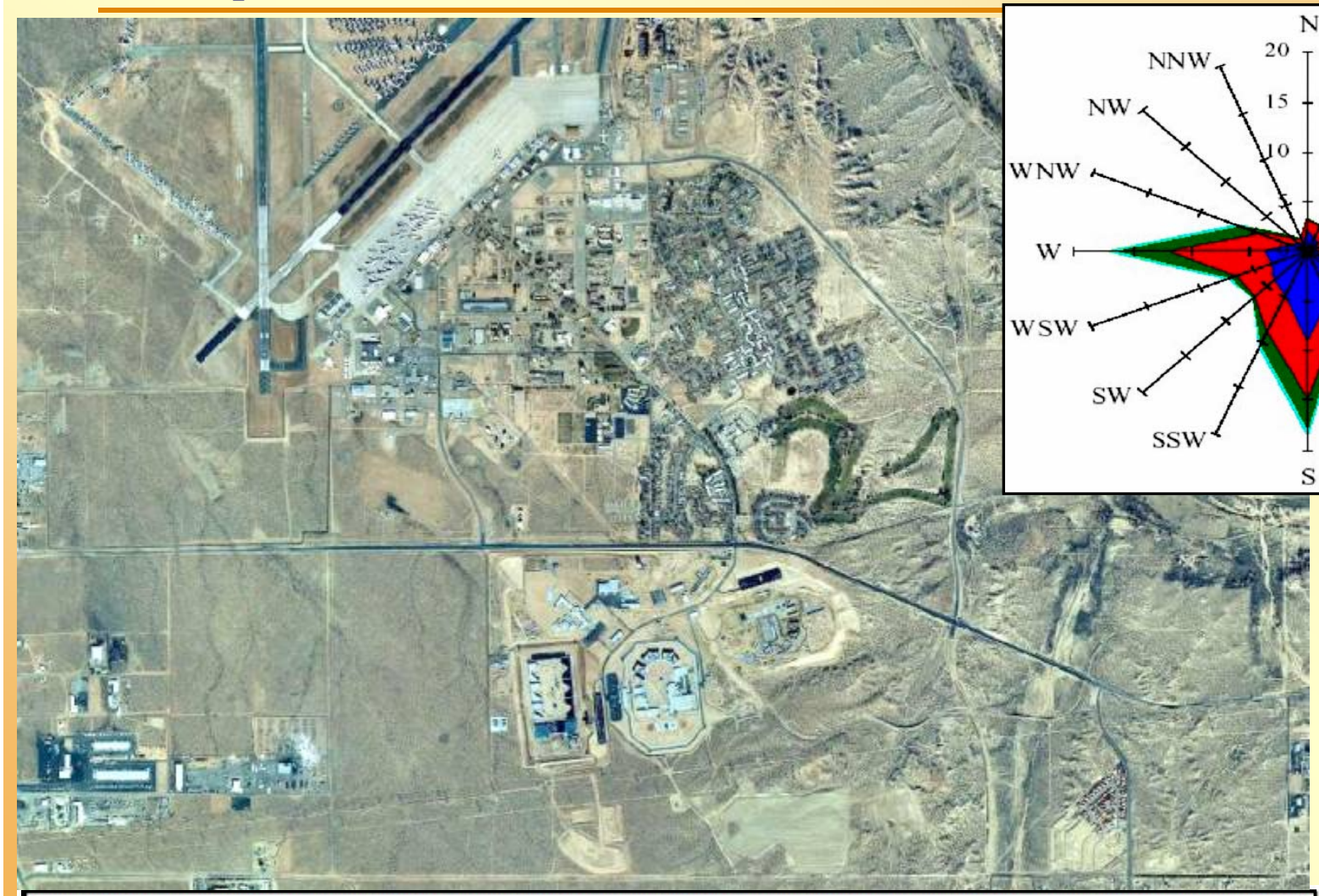
- First ESPC Project for the Bureau of Prisons
- First Utility Scale Wind Turbine under Net Metering
- First Wind-Solar Hybrid Project under California Incentive Program.
- First Utility-Scale Wind Turbine in High Desert Region.
- First ESPC Wind Turbine Project
- Proved that Marginal Wind Regimes can be Financed Under ESPC.

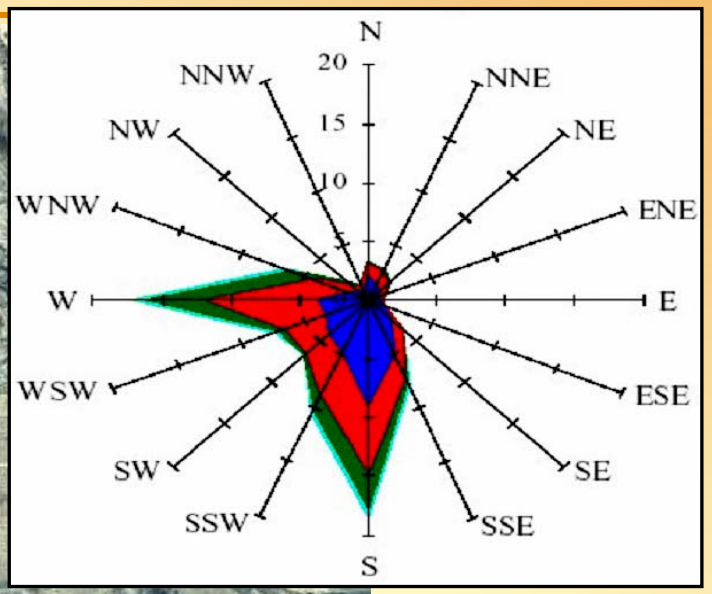
Is Your Site Is A Candidate for Renewable Energy DG?

- Is the State Regulatory Environment Well Defined, Funded and Supportive?
- Are Rates Favorable?
- Are there State or Utility Incentives for Renewables?
- Is there a Net Metering Law in your State? What is the Size Limit?
- Is there a Suitable Location?
- Are there Sustained Winds?
- Is there a Long-Term Nearby Source of Wind Data?
- Are Most Days Sunny?

.....Then Renewable DG is a Candidate

Aerial View Of Prison And Airport





>34 knots | 25-34 knots | 15-24 knots | 6-14 knots | 1-5 knots

Maintaining Turbine Performance Artificial Rain

Guantanamo Bay – Cuba

Facility Type: Naval Base
Facility Size: 5,412,267
Type of Contract: Navy Caribbean ESPC
Term of Contract: 12 Years
Total Capital Cost: $27,513,335
Total Annual Savings: $3,219,792
DES Duration: 10 Months

Technologies:

- Energy efficient lighting and water conservation in over 850 family housing units and 79 commercial buildings. All ECMs were conducted in conjunction with each other in order to minimize disruptions to facility staff and occupants.
- Energy Efficient Lighting measure included new high efficiency T8 fixtures with electronic ballasts and new compact fluorescent drum fixtures.
- Water conservation measure consisted of new faucet aerators, new shower heads and new toilets
- Four - 950 kW wind turbine Generators
- Replacement of Four MUSE generators

Navy Region Southwest – CA

Facility Type: Navy Region
Facility Size: 9,500,000 sq.ft.
Type of Contract: DOE West ESPC
Term of Contract: All DOs 10 Years or Less
Total Capital Cost: $33,217,000
Total Annual Savings: $5,085,000

Technologies:

- 750 kW solar photovoltaic (PV) covered parking structure and a 30 kW roof mounted (PV) array
- Installation of two 60 kW microturbines with heat recovery heat exchangers.
- Energy efficient lighting upgrade of HID fixtures
- Day lighting with installation of skylights and lighting controls system
- DDC upgrade with complete conversion of existing controls to a DDC system connected to an Area-Wide EMCS.
- Irrigation centralized control system
- Restoration of selected HVAC systems to VAV operation through controls and VFDs
- Installation of new dampers and associated controls to support economizer operation.
- Replacement of air-cooled chillers with new, high efficiency models
- Installation of VFDs on chilled water (CHW) pumps.
- Major improvements to facility compressed air plants and systems.
- 5MW Steam turbine generator providing electricity and reducing utility costs. Turbine will be driven by steam that must be purchased under a “take or pay” type arrangement but is not used.

Aerial View of NRSW PV Parking Structure