

CURRENT AND FUTURE COST SAVINGS MEASURES

FORMER NEBRASKA ORDNANCE PLANT

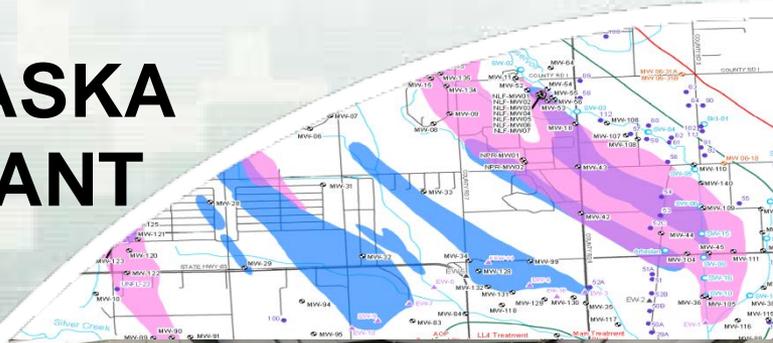
Jason L'Ecuyer– US Army Corps
of Engineers

Nick Kiusalaas – ECC

April 18, 2012



®



PRESENTATION OVERVIEW

- **General overview of Site and energy consumption**
- **Previously implemented cost savings measures:**
 - ✓ Passive Sampling
 - ✓ Utilizing Regenerated Carbon
 - ✓ Groundwater Monitoring Optimization
 - ✓ Report Consolidation
 - ✓ Variable Frequency Drives (VFDs)
- **Energy Audit (performed in 2010 – 2011):**
 - ✓ Utility bill analysis/understanding and opportunities for savings – focus on Demand service
 - ✓ Equipment metering and payback analysis
 - ✓ Results
- **Proposed Wind Turbine Installation**



PREVIOUSLY IMPLEMENTED COST SAVINGS MEASURES

➤ **Passive Sampling**

The Groundwater Sampling Program currently uses passive sampling on all wells saving 25% on labor.

➤ **Utilizing Regenerated Carbon**

Regenerated and certified granular activated carbon (GAC) saving over \$315,000 per year.

➤ **Groundwater Monitoring Optimization**

A statistical analysis of the Monitor Well sampling requirements was conducted resulting in a \$204,000 savings in 2012 alone.

➤ **Report Consolidation**

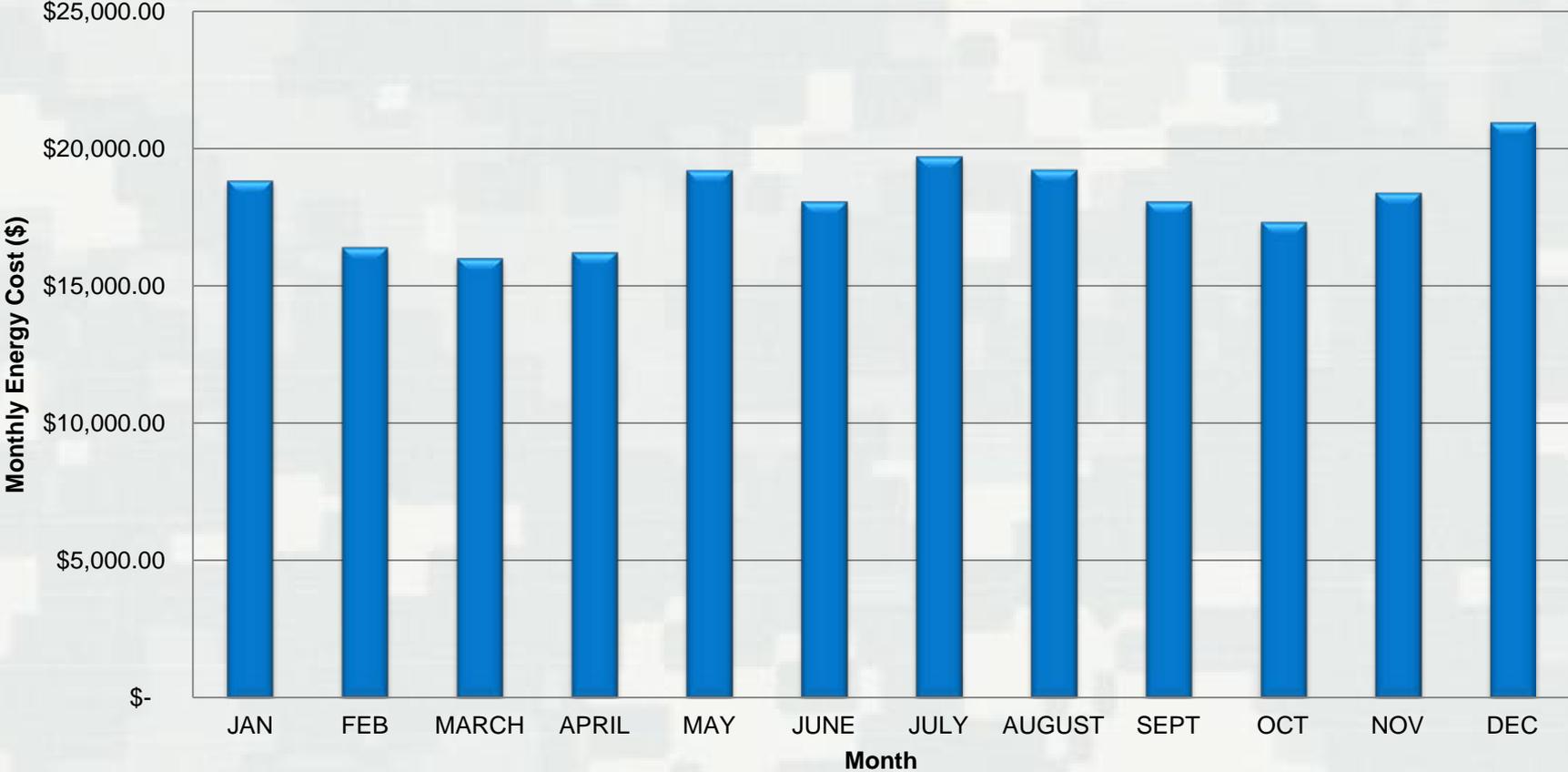
Several yearly reports have been consolidated into a single Annual Report saving over 40% in labor necessary to complete.

➤ **Variable Frequency Drives (VFDs)**

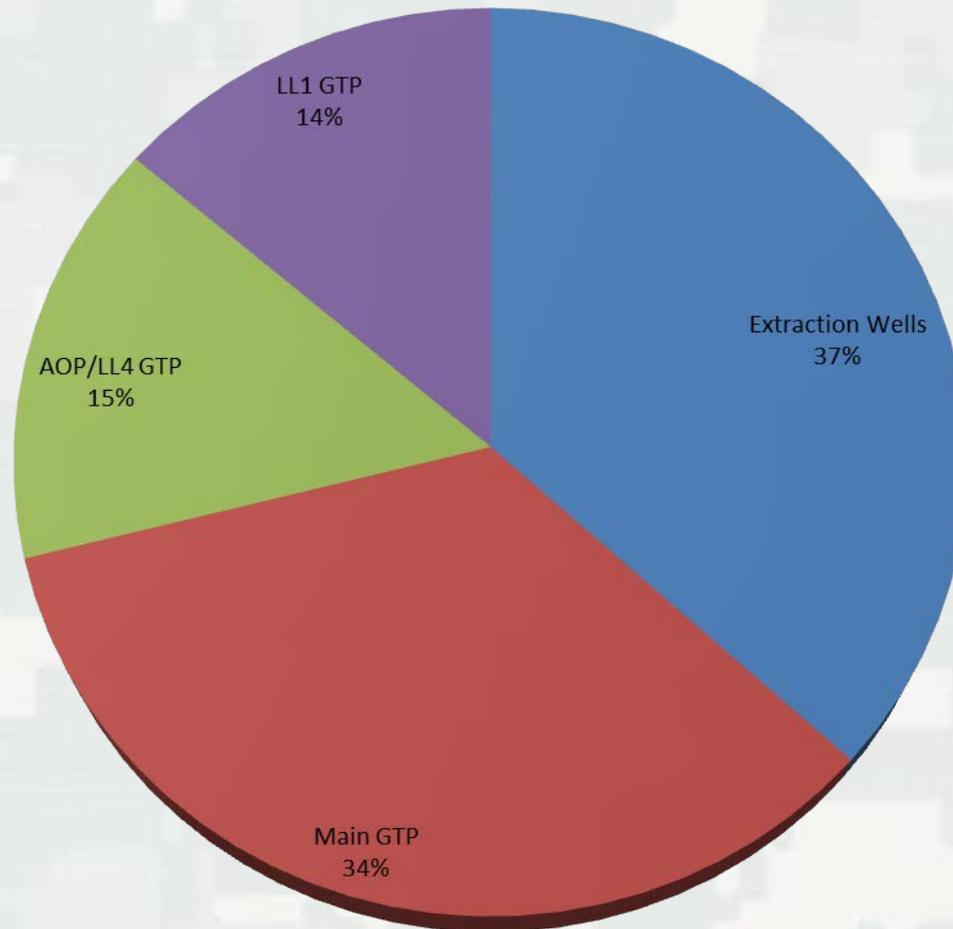
VFDs have been installed on all Extraction Wells saving 35% of the energy used.



2010 ENERGY CONSUMPTION SUMMARY



ENERGY USE BY LOCATION



LL1 GTP = Load Line 1 Groundwater Treatment Plant
Main GTP = Main Groundwater Treatment Plant
AOP/LL4 GTP = Advanced Oxidation Process/Load Line 4
Groundwater Treatment Plant



ENERGY AUDIT PROCEDURES

- Utility bill analysis
 - ✓ Evaluate/Understand utility bill
 - ✓ Demand service savings opportunities (former Nebraska Ordnance Plant saved approximately 22% on bill)
- Site audit
- Equipment metering
 - ✓ Measure efficiency under operating conditions
- Payback analysis and recommendations

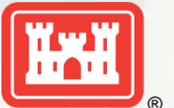
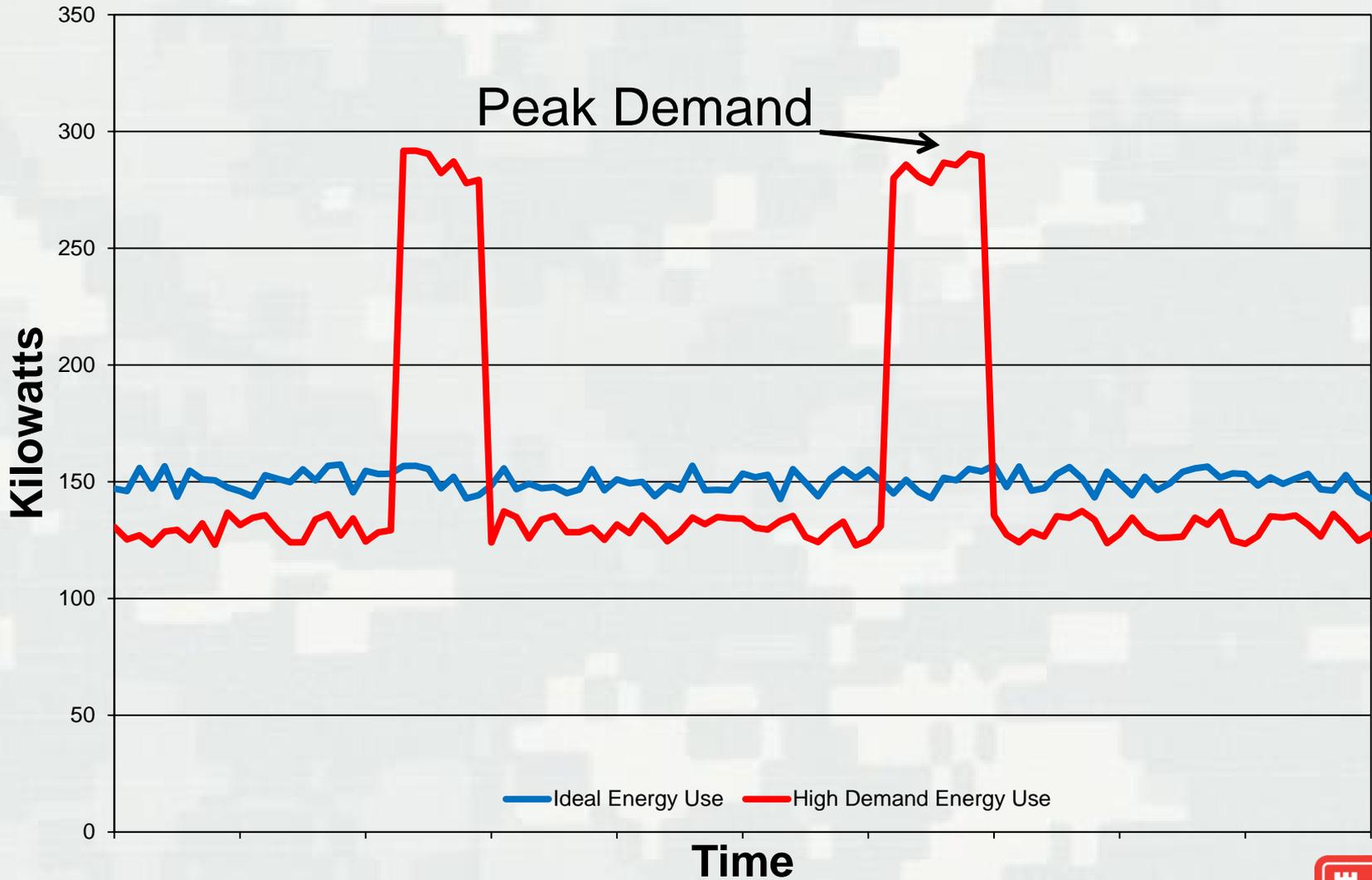


UTILITY BILL ANALYSIS

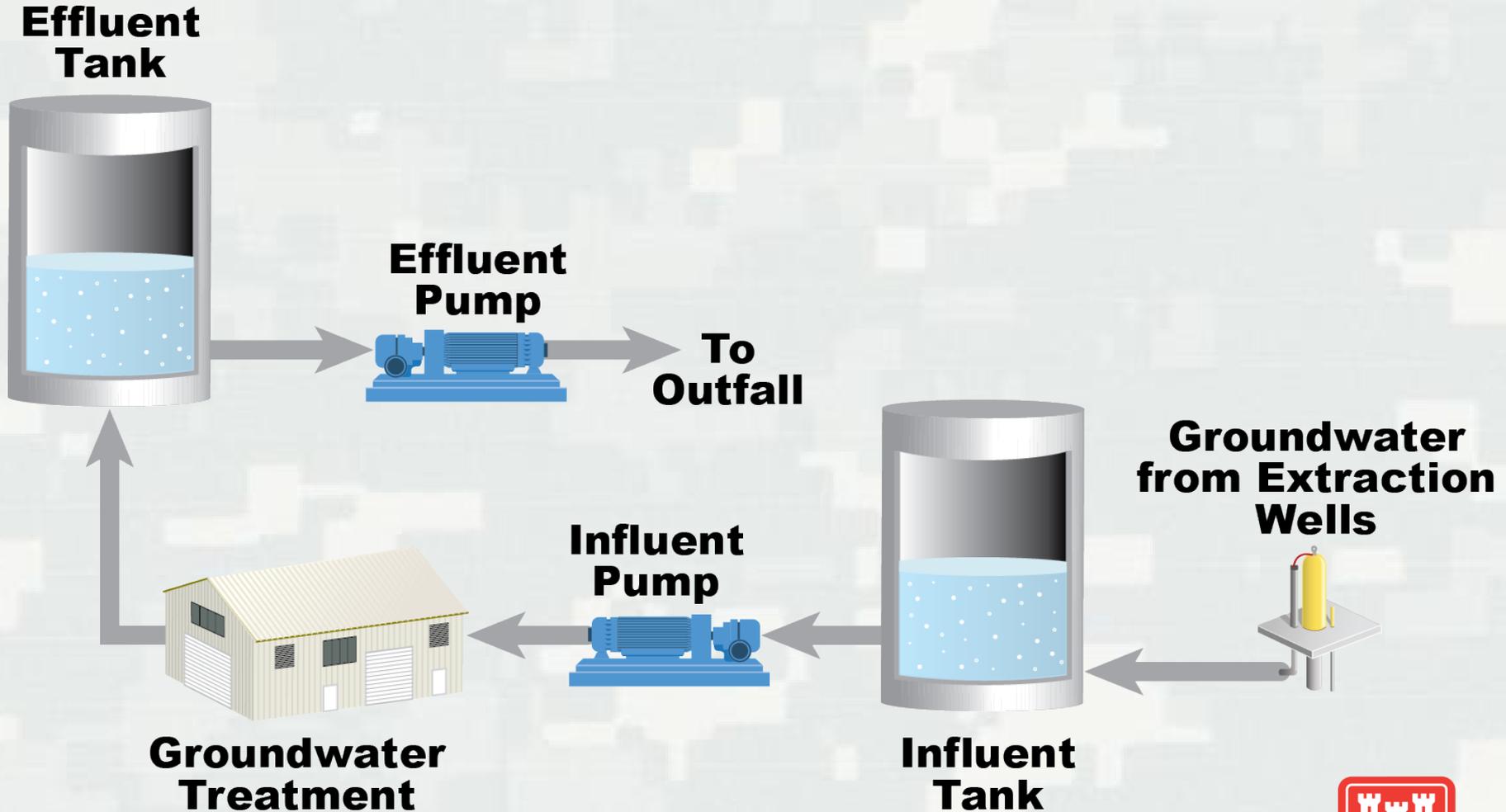
- Typical Utility Service Plans: Demand and Non-Demand
- Non-Demand Service Plans (Typical for Residential)
- Demand service plans:
 - ✓ Demand Charge is based on peak demand that is the highest average energy consumption rate measured over a given period during the billing cycle.
 - ✓ Energy charge is based on energy consumption (KWH) and peak demand (KW).
 - ✓ Most high energy consuming facilities are on demand based service plans.



ENERGY CONSUMPTION GRAPH



SIMPLIFIED GROUNDWATER TREATMENT SYSTEM



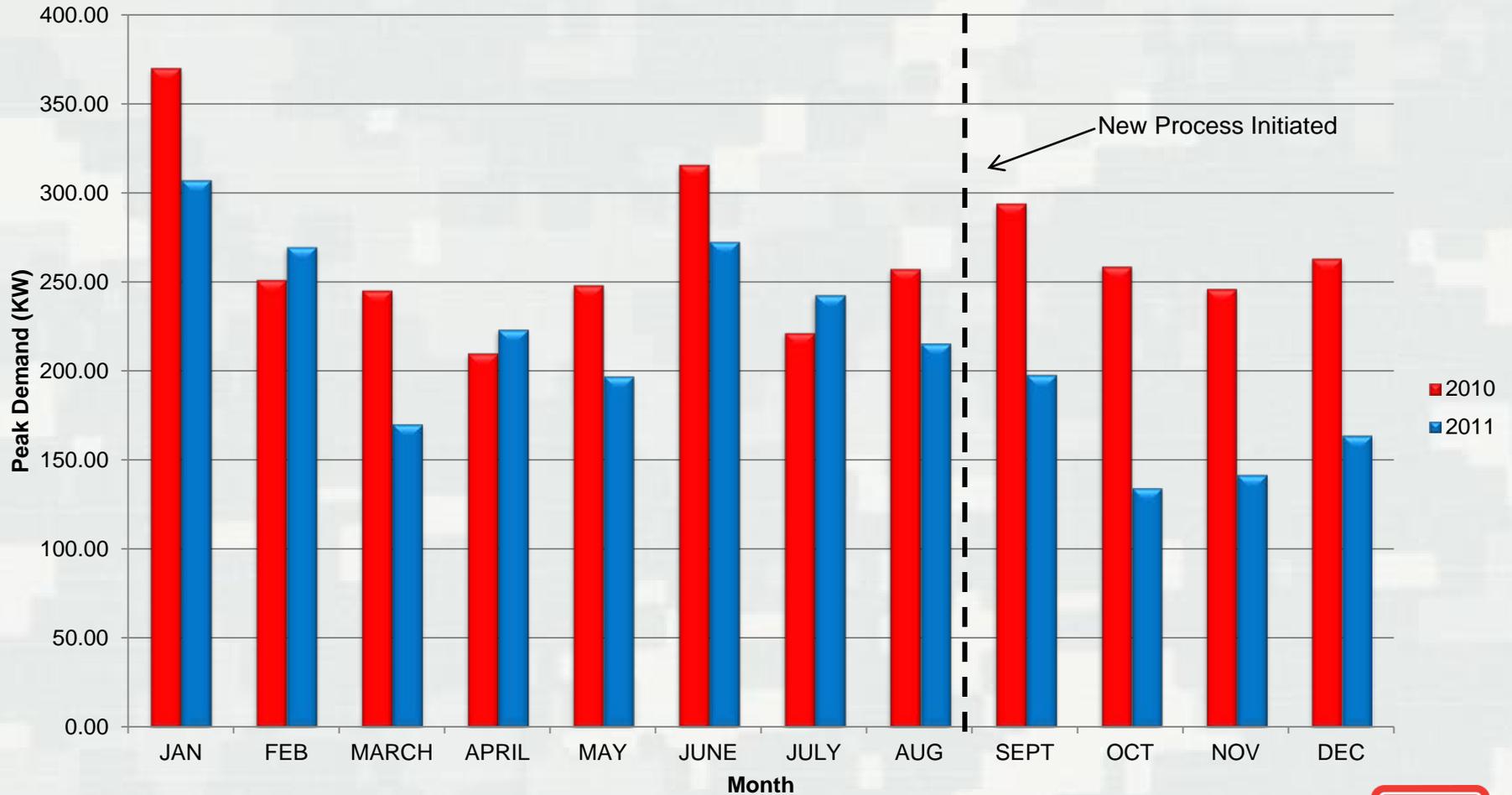
DEMAND REDUCTION

- Change the system startup sequence that occurs after a shutdown to limit the pumping rate of the influent pumps and bring the system back on gradually.
- Goal: Reduce peak demand from an average of 280 KW to 150 KW.
- Estimated savings: With a reduction in peak demand a 22% saving has been realized.



RESULTS

Monthly Peak Demand



EQUIPMENT EVALUATION

- Monitored equipment to measure energy consumption and efficiency under operating conditions.
- Monitored flow rate, pressure, amperage, voltage, and KW usage.
- Compared the manufacturer's data to field measurements to identify poorly performing equipment.
- Determined efficiency of equipment.
- Compared operating conditions (ex. flow, pressure, and energy consumption) to the manufacturer's specifications to identify under- or oversized equipment.



POTENTIAL SAVINGS

Priority	Description	Annual KWH Savings	Annual Cost Savings	Capital Cost	Payback Time (years)	10 Year Projected Savings
1	Peak Demand Reduction	ND	\$19,783	\$0	0	\$197,830
2	Influent Pump Replacement	14,014	\$8,856	\$37,988	4.3	\$50,572
3	Groundwater Extraction Well Pump Replacement	74,477	\$3,307	Varies	2.5 to 8.3	\$19,141
4	Lighting Modifications	6,839	\$410	\$625.00	1.5	\$3,475
Total		95,330*	\$32,356			\$271,018

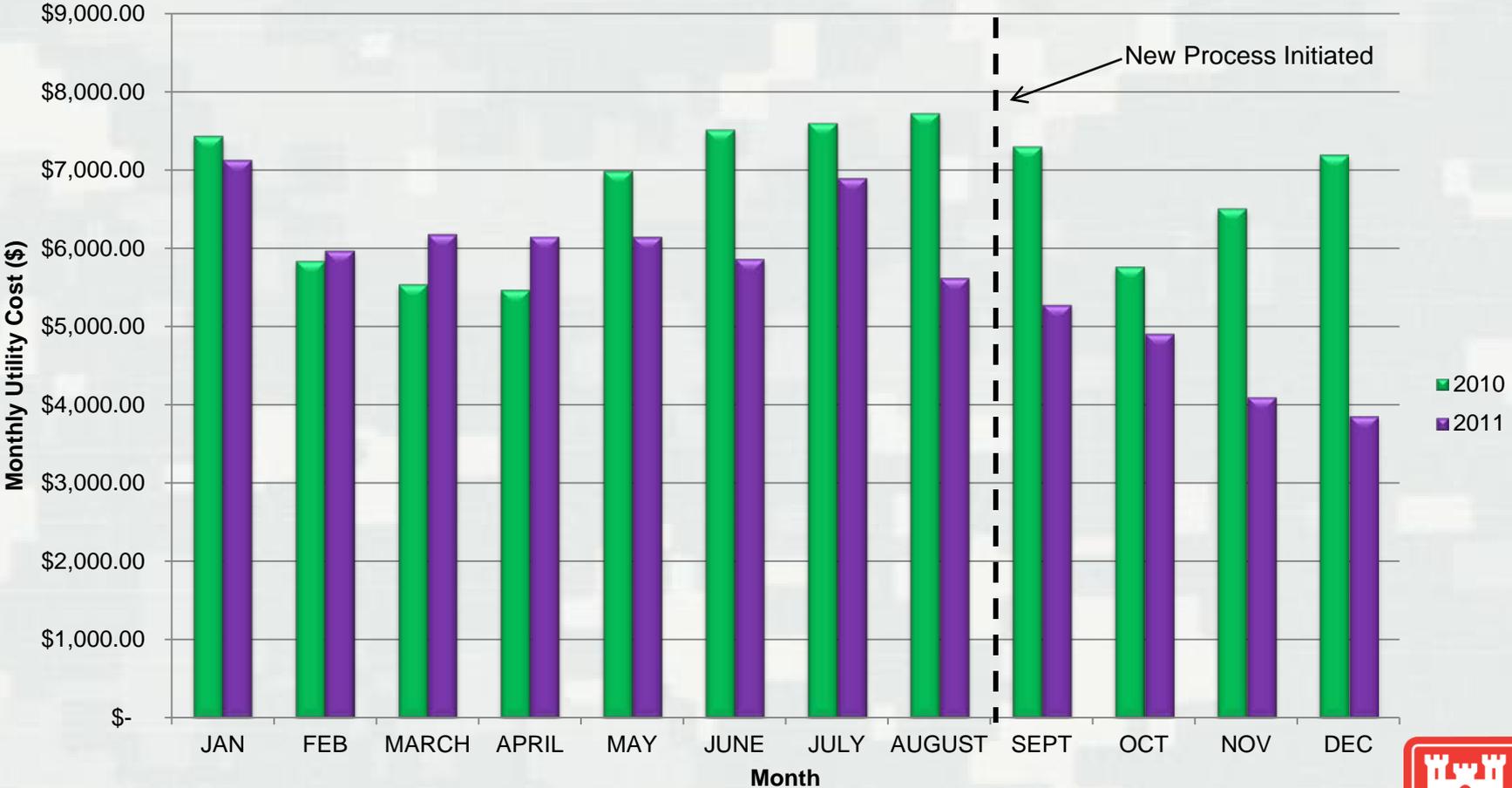
* = Equal to the electricity consumed by 8 households a year

ND = not determined



RESULTS

Main Treatment Plant Monthly Utility Cost



Wind Turbine Generator



BUILDING STRONG®

275 KW Turbines

- Annual energy production of 1,520,000 kWh per year.
- Turbine will offset over 55% of the energy used by the treatment plants
- A reduction of over 68,644,000 lbs of air emissions per year.
- Equal to the electricity consumed by 126 households a year



Questions

WE THE PEOPLE
insure domestic Tranquillity, provide for the common
and our Posterity, do ordain
and establish this Con

