

WILLDAN INDUSTRIAL ENERGY SOLUTIONS

Plant Energy Assessments & Energy Management Platform

IECA Meeting 2023

Scott Wetteland





Agenda

01

About Willdan

02

Challenges and Opportunities

03

Energy Audit and Project Implementation

04

Willdan's Industrial Energy Management Platform



Industrial Solutions:

- Cement/Minerals/Aggregates
- Paper
- Aerospace
- Large Pharma
- Printing
- Injection Molding
- Food & Beverage
- Plastics
- Metals/Machining
- Fabrication & Extrusion
- Data Centers
- Distribution Centers
- Refrigerated Warehouses
- Telcom

Willdan's team knows the industrial sector, and we understand industrial processes

- **Founded in 1964**
- **25+ Years Energy & Industrial Experience**
- **150+ Industrial projects NAESCO Accredited**
- **Saved 1,400 MW and 6,800 GWh**
- **Saved 100M Therms**
- **5,400,000 MT GHG Avoided**
- **1,280 Staff in 60 Offices**

Willdan Can Help



Reduce

- Total energy spend
- Unit cost of production
- GHG emissions
- Down time



Improve

- Process systems
- Energy operating performance
- Reliability
- Market share



Provide

- Long-lasting EE solutions
- Analysis & implementation
- GHG Offset and REC
- DER feasibility
- Microgrid options feasibility

We Understand Energy Challenges

Willdan has the **expertise** and **resources** to help you reach your energy goals

Not enough:



Resources to complete energy analysis



Capital access when process improvements take priority



Access to emerging tech costs and design. On site utility production



Customer Pressure to Reduce GHG & Net 0



Corporate guidance on energy and sustainability



Time to focus on energy/utility costs

Ongoing pressure to:



Meet **production goals**



Reduce **production costs**



Maintain **equipment operation**

Potential Opportunities

Willdan can work with your business to cost effectively reduce GHGs gaining a competitive advantage in the marketplace and increasing market share

- 1 Energy Efficiency, energy used per unit produced**
(Total kWh and MMBTU used)
- 2 On site electric, hydrogen and oxygen production**
Use the waste heat to produce on site electricity, use on site solar to drive oxygen and hydrogen production reducing operating cost and GHGs
- 3 Purchase biomethane and GHG offsets**
Nemak can partner with biomethane producers, community solar, Green House Gas offset programs

The cost of renewable energy credits has tripled in the last 3 years. Electrical and fuel rates are on the rise globally making on site solutions more valuable

Willdan and its subsidiaries provide all the services Companies need to navigate the changing environmental, corporate and regulatory requirements



Energy Efficiency Audit

Efficiency is the first step to reduce GHG and cost of operation

Identify Projects

- Our expert staff will work with your personnel to identify efficiency opportunities
- Collect equipment information and operating data
- Install data loggers
- Estimate project costs

Evaluate Projects

- Evaluate projects based on est. savings, est. project cost, GHG reduction and reliability
- Review potential projects with your personnel
- Prepare and present the energy efficiency report and calculations

Support Implementing Projects

- Provide turn-key upgrades
- Provide design engineering
- Provide measurement and verification

Furnace Efficiency

Picture of holding furnaces that feed casting lines

- Increase burner efficiency
- Reduce waste heat with insulation, better design and controls
- Utilize waste to provide preheating, chiller water and electricity
- Use hydrogen and oxygen to reduce natural gas consumption



Add invertors, dampers and temperature-based controls to reduce heat loss. This will increase the efficiency of the exhaust system and the crucible saving electricity and gas with a low capital cost.

Existing Air Dryers

Picture of the existing desiccant and refrigerated air dryers

Desiccant air dryers consume approximately 15% of the air compressor energy in compressed air use.



Utilizing heat of compression technology will consume >1%

Existing Air Compressors

Picture of 4 existing 1000hp air compressors drawing the inlet air from the mechanical room

The negative pressure in the mechanical room created by the inlets reduces the capacity and efficiency of the air compressors



The existing inlet filters on the compressors appears to be undersized

Existing Dust Collectors

Picture of 4 existing dust collectors and fans

The existing dust collectors and fans are not utilizing inverter technology leading to inefficiency



Inverter (VFD) technology can reduce the electrical consumption by 40%

Willdan Provides Results

Energy and GHG Reduction Project List (Chemical Company)

	Estimated Project Cost	Estimated Annual Energy Savings [kWh]	Estimated Annual CO ₂ Savings [t]	Estimated Annual Measure Savings [\$]	Estimated Incentive	Simple Payback Period
#1 Interior Lighting Elec	\$2,500.00	5,152	2	\$703.38	\$412.16	2.97 Years
#2 Exterior Lighting Elec	\$60,000.00	213,040	79	\$23,747.52	\$17,043.20	1.81 Years
#3 Roll Crusher VFD Retrofit	\$50,000.00	186,425	69	\$16,405.40	\$16,778.25	2.03 Years
#4 Feed Water P7 8 VFD Retrofit	\$600,000.00	1,559,259	577	\$137,214.77	\$140,333.28	3.35 Years
#5 C Water P12 13 VFD Retrofit	\$700,000.00	1,431,744	530	\$138,493.47	\$128,856.96	4.12 Years
#6 VFD 250hp and 50hp Air Comps	\$200,000.00	489,925	181	\$53,113.39	\$44,093.24	2.94 Years
#7 Central Comp Air and Control	\$80,000.00	202,752	75	\$23,842.18	\$18,247.68	2.59 Years
#8 Dust Collector 2 4 8 9 VFD	\$60,000.00	96,195	36	\$14,465.19	\$8,657.58	3.55 Years
#9 2 100hp Well VFD Retrofit	\$80,000.00	238,624	88	\$20,998.91	\$21,476.16	2.79 Years
#10 2 100hp Scrub VFD Retrofit	\$80,000.00	238,624	88	\$20,998.91	\$21,476.16	2.79 Years
Total for Electric Projects	\$1,912,500.00	4,661,740	1,726	\$449,983.11	\$417,374.67	3.32



Affordable, High-Value Solutions to achieve the Companies Goals

What comes next?

Willdan Proposal Implementation

- One week on site (2 engineers)/ one week data analysis/ 3 weeks report
- Facility energy efficiency audit to identify and evaluate potential projects
 - Review current energy contracts and associated costs
 - Evaluate potential projects; waste heat, electrical efficiency, natural gas efficiency, on site or near facility electric, oxygen and hydrogen gas production
 - Engage with utility providers for potential incentives, assistance and partnerships
 - On site live electric, fuel, water and process monitoring

Industrial Energy Management System (EMS) Platform

- Designed and built by industrial experts
- User-friendly dashboard
- Cloud-based



Powered by



Willdan's Industrial EMS Helps Business Succeed



Increase Profits

- Lower energy bill
- Reduce unit cost of production (increased profitability)
- Use real time reporting to validate GHG reductions



Increase Efficiency

- Continuous monitoring
- Evaluate system performance
- Identify potential improvements
- Validate upgraded performance

The Industrial EMS provides Business competitive advantage

Increase reliability

- Extend equipment life, decrease down time
- Prevent equipment failure (find underperforming, energy-hogging equipment)
- Avoid cost of equipment failures

Improve maintenance

- Data and operating costs drive proactive maintenance, repair, and replacement
- Historical and real time data will reduce downtime saving money and increasing production

Track emissions reduction

- Real-time monitoring and historical data
- Easy reporting (GHG + carbon reductions) for national leadership

Other Services



Willdan Capabilities

- Implementation of energy audit measures as approved
- Energy Management System (EMS) design, engineering and installation
- Net-zero plan to meet corporate long-term goals. A strategic plan to achieve net zero by the customer's future goal
- Planning for GHG offsets and Renewable Energy Credits
- Evaluation for community distributed energy resources
- Design, Planning, Engineering and Project Implementation



Questions/Contacts

Ray Siada
WES - Director
248 613-7660
rsiada@willdan.com

Scott Wetteland
WES – Senior Engineer
775 770-4631
swetteland@willdan.com