Who is Cypress Envirosystems?

Heritage
- Subsidiary of Cypress Semiconductor (NASDAQ: CY)
  - Quality-driven processes
  - Deep technology experience: Cypress wireless devices are in 100 million devices all around us
- Sister company of SunPower

Leadership
- CEO: Harry Sim, ex-Honeywell executive (15yrs.)
- Executive staff: Over 100 years of facilities and energy experience

Mission
- Modernize existing facilities
- Develop technologies that cost 60-80% less than existing solutions
- Enable retrofits that install in minutes, avoid disruption, require little or no retraining
- Target payback of less than 18 months

Applied to Legacy Facilities

Cutting Edge Silicon Valley Technology
Cypress Envirosystems: Problems We Solve...

Need to save energy & improve uptime, but hindered by outdated facility?

- Pneumatic Thermostats
- Dial Gauges
- Steam Traps
- Standalone Transducers, LED/LCD Displays
- -80C Freezers
- Legacy Fluorescent Lighting

Manual Instrumentation, Not Programmable, No Diagnostics...
Equals: Wasted Energy, Higher Downtime, More Labor Required

www.CypressEnvirosystems.com
What is our Solution?

- **WIRELESS PNEUMATIC THERMOSTAT**
  “Go from Pneumatic to DDC in minutes”

- **WIRELESS STEAM TRAP MONITOR**
  “Avoid Expensive Steam Leaks”

- **BLUE BOX HUB/RECEIVER**

- **WIRELESS GAUGE READER**
  “Remotely Read Gauges in minutes”

- **WIRELESS TRANSDUCER READER**
  “Remotely Read Transducers – No Wires”

- **WIRELESS FREEZER MONITOR**
  “Predicts and Avoids Costly Freezer Failure”

- **WIRELESS LIGHT CONTROLLER**
  “Reduce Electricity Use”

**Non-invasive, easy retrofit, energy and labor savings, payback under one year**
# Focus on Areas of Largest Energy Use and Waste

## Industrial Plants

- Steam, Thermal – 40%  
  (solution: WSTM)
- Compressed Air – 25%  
  (solution: WGR, WTR)
- Rotating Equipment, pumps, HVAC – remainder  
  (solution: WGR, WTR, WFM, WBM)

## Commercial Buildings

- HVAC – 40%  
  (solution: WPT)
- Lighting – 20%  
  (solution: Adura ALPS partnership)
- Plug loads, data centers – remainder  
  (solution: WTR, WBM)

Source: US Energy Information Administration, 2007
Regulation Drivers: California Example

• Default Critical Peak Pricing
  - Starting May 1\textsuperscript{st}, 2010, virtually all commercial office building customers will move to a default electricity pricing rate called Critical Peak Pricing. [www.pge.com/mybusiness/energysavingsrebates/demandresponse/cpp/](http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/cpp/)
  - This rate structure provides for discounted rates when no CPP events are called. However, on CPP event days, higher “critical peak” energy charges will be assessed for usage between noon and 6pm.
  - Customers are notified by PG&E by 3pm the day prior to the critical event.
  - Customers with Auto-Demand Response enabled buildings (e.g. communicating thermostats, lighting etc.) can automatically reduce usage using these high rate periods to avoid high charges.

• Assembly Bill 1103 – Building Energy Efficiency Disclosure
  - Starting January 1, 2010, all commercial building lease transactions must disclose the energy efficiency history and Energy Star rating of the facility. More efficient buildings will be able to attract premium tenants, and potentially command a rental premium.

Source: California Public Utilities Commission Decision, July 31\textsuperscript{st}, 2008 (see page 21 and Attachment B) [http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/85984.pdf](http://docs.cpuc.ca.gov/word_pdf/FINAL_DECISION/85984.pdf)
Retrofit of Pneumatic HVAC Controls
70% of Commercial Buildings Still Pneumatic

- **Waste energy, more maintenance, unhappy tenants...**
  - No Night Setback, No Zone Control, No Optimal Start/Stop,
    No Occupancy Override, No Demand Response...

- **High Cost to Retrofit**
  - Market rate of $2,000 - $3,000 per zone
    for traditional DDC retrofit

- **Disruptive to Tenants**
  - Open Walls, Ceiling, Exposure to Asbestos

*Retrofitting Existing Buildings is a PAIN IN THE NECK!!*
The WPT enables zone control without disrupting occupants

- Opening walls and running wire drive up traditional DDC retrofit costs
- Occupants do not want to be disrupted by projects
- The WPT provides benefits of DDC zone control
  - 20-minute retrofit
  - 80% lower cost
  - Minimal disruption

Traditional DDC Retrofit is Invasive

WPT Provides DDC Zone Control without Disruption

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Identify pneumatic thermostat type</td>
<td>Remove thermostat and backplate</td>
<td>Install WPT backplate to wall</td>
<td>Attach pneumatic pipes to WPT</td>
<td>Hang on wall and integrate with BAS</td>
</tr>
</tbody>
</table>

www.CypressEnvirosystems.com
Enabling Smart Grid – Auto Demand Response

- County of Santa Clara, Social Services Administration
- 2 Buildings, each 5 story, built 2000
- Total 300,000 sq-ft
- 350 Pneumatic Thermostats, non-communicating
- Estimated Demand Response load shed: 200kW
- Would like to participate in PG&E Auto-DR program, but challenging with pneumatic thermostats
15 Minute Replacement of Thermostat
80% Lower Cost, 5% of the Time vs. Conventional DDC

Santa Clara County Government Project

<table>
<thead>
<tr>
<th></th>
<th>Cypress Envirosystems Wireless Pneumatic Thermostats Retrofit</th>
<th>Conventional Direct Digital Control Retrofit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installed Price</td>
<td>$175,000</td>
<td>$875,000</td>
</tr>
<tr>
<td>Time Required</td>
<td>8 days</td>
<td>6 months</td>
</tr>
<tr>
<td>Disruption to Operations</td>
<td>Minimal</td>
<td>Significant</td>
</tr>
<tr>
<td>Potential Exposure to Toxic Substances in Walls</td>
<td>None</td>
<td>Unknown</td>
</tr>
<tr>
<td>Paid for by PG&amp;E Auto DR Incentive</td>
<td><strong>100% covered</strong></td>
<td>31% covered</td>
</tr>
</tbody>
</table>

“Installation took only eight days and was one of the easiest, fast and most cost effective energy efficiency improvements we have ever made in our buildings”
- Jeff Draper, Manager of Building Operations
Quantified Savings for Santa Clara County

300,000 sq-ft facility, $175,000 cost to retrofit (before utility incentives)

- **Energy Savings:** $42,000 per year
  - 350,000 kWh per year base load reduction, at $0.12 per kWh
  - Derived from enforcing Temperature Setpoint Policy and Retrocommissioning

- **Demand Response Savings:** $7,500 per year
  - 10,700 kWh curtailed at peak rates $0.70 per kWh
  - Based on 12 events per year, 4 hours each, 0.6kW shed per thermostat

- **Maintenance Cost Savings:** $156,000 per year
  - Continuous commissioning data helped prioritize maintenance and reduced troubleshooting time

- **Payback Period:** 16 months *BEFORE UTILITY INCENTIVES*
  - Some savings kick in partially in first year, fully in subsequent years.
Wireless Pneumatic Thermostat Savings

Estimated Savings Potential
$635/year (per 1000 sq-ft)
Upfront Retrofit Cost: $600 (per 1000 sq-ft)
Payback Period: 11 months

Energy Savings
18-30% reduction in HVAC use
2500 kWh per year / 1000 sq-ft
$235/year @ $0.10/kWh

Maintenance Savings
3-6 hours/year per 1000 sq-ft
$400/year @ $80/hour

Temp Setpoint Policy
Retro Commissioning
Night/Weekend Setback & Occupancy Override
Duct Static Pressure & Supply Air Temp Reset
Deadband Temp Policy

Automatic Calibration
Faster Trouble-Shooting/On-going Commissioning
Reduced Tenant Complaints/Calls

10-15%
1200 kWh/yr
$115/yr

Source: Case Study

5-10%
600 kWh
$60/yr

Source: DOE2 eQUEST Modeling

2-4%
300 kWh
$30/yr

Source: Trane Application Note

3-5%
400 kWh
$30/yr

Source: Cypress Modeling

5 hours/yr
$400/yr

Source: Case Study

Note: All calculations based on 300,000 sq-ft retrofit project, $0.10 per kWh electricity rate, and $80 per hour maintenance labor rate.
Temp Setpoint Policy / Retrocommissioning Savings

Enforcing Temperature Setpoint Policy

- Conventional Pneumatic Thermostats drift out of calibration, and are often set on max or min by occupants.

- Result: zones often over-cool or over-heat, and even fight among each other, wasting energy.

- WPT Solution: Enforce thermostat setpoint remotely. Monitor constantly and set alarms if over/below limits.

Retrocommissioning

- Conventional Pneumatic Thermostats, do not provide any data for diagnostics

- Result: malfunctioning zones are not detected or corrected, wasting energy.

- WPT Solution: Monitoring data enable discrepancies to be quickly identified. Take Low-cost or no-cost retrocommissioning steps to correct.
The WPT’s Diagnostic Data Enable Retro and Ongoing Commissioning to Improve Maintenance Costs and Save Energy

**Diagnostic Data**

<table>
<thead>
<tr>
<th>Alarm</th>
<th>Possible Faults</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
<td></td>
</tr>
<tr>
<td>Faulty Reset Velocity Controller</td>
<td>Stuck damper</td>
</tr>
<tr>
<td>Faulty Reset Velocity Controller</td>
<td>Broken spring</td>
</tr>
<tr>
<td>Faulty Reset Velocity Controller</td>
<td>Undersized cooling capacity design</td>
</tr>
</tbody>
</table>

- Faulty Reset Velocity Controller
- Stuck damper
- Broken spring
- Undersized cooling capacity design

**Temperature °F**

- Setpoint Temp
- Room Temp
- Branch Pressure
Actual Case Study Results: 15% Savings

- Santa Clara County Government Buildings – 300,000 sq-ft retrofit completed in March 2009.
- Actual Post-retrofit energy use compared with same period in prior year, adjusted for deg-days.
- Reduction in HVAC energy use of 15% due to temperature setpoint policy and retrocommissioning.


Actual Year-Over-Year Energy Savings From WPT Retrofit

1 Graph is based on actual PG&E billing data and reflects average kWh/day. The range shown is 15,000 to 20,897 kWh/day.

Documented 15% Reduction on HVAC Energy Use vs. Prior Year Due to Retrocommissioning and Temperature Setpoint Policy Enforcement
Wireless Pneumatic Thermostat Savings

Estimated Savings Potential
$635/year (per 1000 sq-ft)
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Payback Period: 11 months

Energy Savings
18-30% reduction in HVAC use
2500 kWh per year / 1000 sq-ft
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- Temp Setpoint Policy
  - 10-15%
  - 1200 kWh/yr
  - $115/yr
  - Source: Case Study

- Retro Commissioning

- Night/Weekend Setback & Occupancy Override
  - 5-10%
  - 600 kWh
  - $60/yr
  - Source: DOE2 eQUEST Modeling

- Duct Static Pressure & Supply Air Temp Reset
  - 2-4%
  - 300 kWh
  - $30/yr
  - Source: Trane Application Note

- Deadband Temp Policy
  - 3-5%
  - 400 kWh
  - $30/yr
  - Source: Cypress Modeling

Maintenance Savings
3-6 hours/year per 1000 sq-ft
$400/year @ $80/hour

- Automatic Calibration
- Faster Trouble-Shooting/On-going Commissioning
- Reduced Tenant Complaints/Calls

Source: DOE2 eQUEST Modeling

Note: All calculations based on 300,000 sq-ft retrofit project, $0.10 per kWh electricity rate, and $80 per hour maintenance labor rate.
Temp Setpoint Policy / Retrocommissioning Savings

**Weekend/Night Setback**

- Many buildings have mixed use occupants with different use schedules e.g. 24x7 data centers, vs. 9-5 offices

- Pneumatic Thermostats do not allow programmable zone controls.

- Result: Zones are cooled or heated even when they are not occupied.

- WPT Solution: Temperature Setbacks can be programmed for different zones to reduce unnecessary energy use.

**Occupancy Override**

- Occupants may override programmed weekend or night setback if they are working late or on weekends.

- Front panel buttons on the WPT allow occupants to select override for temporary durations.

- Log of override zones are available to the building manager for optional billing allocation of costs.
Actual Case Study Results: 10% Savings


- Calculated energy savings for night/weekend setback using DOE2 eQUEST tool from US Dept. of Energy.

- Predicted reduction in HVAC energy use of 10%.

Calculated 10% Reduction on HVAC Energy Using eQUEST Modeling Software from the US Department of Energy
Estimated Savings Potential

$635/year (per 1000 sq-ft)
Upfront Retrofit Cost: $600 (per 1000 sq-ft)
Payback Period: 11 months

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Source: Case Study

Retro Commissioning

Night/Weekend Setback & Occupancy Override
- 5-10%
- 600 kWh
- $60/yr
Source: DOE2 eQUEST Modeling

Duct Static Pressure & Supply Air Temp Reset
- 2-4%
- 300 kWh
- $30/yr
Source: Trane Application Note

Deadband Temp Policy
- 3-5%
- 400 kWh
- $30/yr
Source: Cypress Modeling

Automatic Calibration

Faster Trouble-Shooting/On-going Commissioning

Reduced Tenant Complaints/Calls
- 5 hours/yr
- $400/yr
Source: Case Study

Note: All calculations based on 300,000 sq-ft retrofit project, $0.10 per kWh electricity rate, and $80 per hour maintenance labor rate.
Duct Static Pressure Reset Savings

- Reduce Ventilation Fan Speed / Duct Static Pressure when heating/cooling not required. Keep at minimum for Indoor Air Quality

- When heating/cooling required, increase fan speed for proper temperature control

- Save energy by reducing fan load when not needed.

- WPT Solution: Built-in branch pressure sensor directly indicates heating or cooling load, and enables existing Building Management Systems to control fan speed appropriately.

Trane Models for DDC Systems Show 2-4% Energy Savings from Duct Static Pressure Reset. WPT Achieves Same Application with Pneumatic System.
Wireless Pneumatic Thermostat Savings

Estimated Savings Potential

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Retro Commissioning

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$115/yr

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3-5%
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Maintenance Savings
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Automatic Calibration

Faster Trouble-Shooting/On-going Commissioning

Reduced Tenant Complaints/Calls

Note: All calculations based on 300,000 sq-ft retrofit project, $0.10 per kWh electricity rate, and $80 per hour maintenance labor rate.
Deadband Temperature Setpoint Policy

What is it?

• When zone temperature is within certain limits e.g. between 68F and 78F, **ALL HEATING AND COOLING IS DISABLED** for that zone.
• When ambient temperature is outside these limits, heating and cooling is **ENABLED** to maintain basic comfort.

Why?

• Up to 60% energy savings potential, for occupants who can tolerate some range of temperature swing.
• Many universities and public institutions have mandated this type of temperature setpoint policy...the Deadband WPT enables and automatically enforces the policy.
• Benefits are INCREMENTAL to Night Setback, Occupancy Override, Demand Response and other energy management strategies available with the standard WPT (and also available on deadband WPT).
Comparison: Standard Pneumatic vs. Deadband Function

Standard Pneumatic Thermostat Behavior (Typical, Direct Acting)

Conventional Setpoint

Heating

Cooling

Ambient Temperature (deg F)

Branch Pressure (psi)

Deadband Pneumatic Thermostat Behavior (Typical, Direct Acting)

Min Setpoint*

Max Setpoint*

Heating

Off

Cooling

Ambient Temperature (deg F)

Branch Pressure (psi)

*Minimum and Maximum Setpoints are selectable by user or building manager
## Energy Savings Enabled by Deadband

<table>
<thead>
<tr>
<th>Mode</th>
<th>% of time operating in:</th>
<th>Est. Energy Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mode A</td>
<td>Mode B</td>
</tr>
<tr>
<td>Location 1 (e.g. San Diego, CA)</td>
<td>20%</td>
<td>70%</td>
</tr>
<tr>
<td>Location 2 (e.g. Fargo, ND)</td>
<td>75%</td>
<td>20%</td>
</tr>
<tr>
<td>Location 3 (e.g. Miami, FL)</td>
<td>20%</td>
<td>50%</td>
</tr>
</tbody>
</table>

### Deadband Savings By Mode vs. Standard Stat

- **Mode A** – Min Setpoint 4F below conventional Setpoint => 8% energy savings.*
- **Mode B** – Only ventilation fans running, no heat or cool => 80% energy savings.**
- **Mode C** – Max Setpoint 6F above conventional Setpoint => 12% energy savings.*

---

* Every degree of setback equals 2% energy savings. Source: ACEEE.
** Ventilation uses about 20% of the energy in HVAC even when cooling or heating is not active. Source: US Energy Information Administration.
Wireless Pneumatic Thermostat Savings

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Source: Case Study

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$60/yr

Source: DOE2 eQUEST Modeling

2-4%
300 kWh
$30/yr

Source: Trane Application Note

3-5%
400 kWh
$30/yr

Source: Cypress Modeling

Note: All calculations based on 300,000 sq-ft retrofit project, $0.10 per kWh electricity rate, and $80 per hour maintenance labor rate.
Savings from Reduced Maintenance

- Auto-Calibration

- Reduced Tenant Hot/Cold Calls:
  Built-in BACnet and email alarm notification - before tenants complain.

- Faster Troubleshooting/On-going Commissioning:
  Built-in branch pressure, zone temperature, and setpoint temperature sensors with trending, history, and alarming. Service strategy converted from Scheduled Maintenance to Condition Based Maintenance, and enable Ongoing Commissioning.

- Actual Case Study Results, Santa Clara County Government – 300,000 sq-ft retrofit
  - 60% reduction in maintenance service – from $25k/month to $10k/month
  - Key learnings: predictively detect faults, dispatch service personnel only to zones with identified faults, and monitor to confirm fault is fixed post service call.

# LEED Credits

## LEED for Existing Buildings: Operations & Maintenance
Registered Project Checklist

<table>
<thead>
<tr>
<th>Energy &amp; Atmosphere, continued</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Existing Building Commissioning</strong></td>
</tr>
<tr>
<td>Credit 2.1</td>
</tr>
<tr>
<td>Credit 2.2</td>
</tr>
<tr>
<td>Credit 2.3</td>
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<table>
<thead>
<tr>
<th><strong>Performance Measurement</strong></th>
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</thead>
<tbody>
<tr>
<td>Credit 3.1</td>
</tr>
<tr>
<td>Credit 3.2-3.3</td>
</tr>
<tr>
<td>Credit 3.2</td>
</tr>
<tr>
<td>Credit 3.3</td>
</tr>
</tbody>
</table>

*Tenant Comfort and Satisfaction, Ability to Attract Top Tier Tenants, and Lower Lease Churn Rates Are Incremental to Energy Savings Benefits*
# Compatible with Existing Systems

<table>
<thead>
<tr>
<th>VENDOR</th>
<th>BAS</th>
<th>TEST PARTNER</th>
<th>LOCATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alerton</td>
<td>BACtalk</td>
<td>Syserco</td>
<td>Fremont, CA</td>
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<tr>
<td>Automated Logic</td>
<td>ALC</td>
<td>ACCO Engineered Systems</td>
<td>San Leandro, CA</td>
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<tr>
<td>Honeywell</td>
<td>Excel, Tridium</td>
<td>Honeywell Corp.</td>
<td>Golden Valley, MN Wixom, MI</td>
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<tr>
<td>Johnson Controls</td>
<td>Metasys</td>
<td>RSD-Total Control JCI Sensor Products</td>
<td>San Jose, CA Milwaukee, WI</td>
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<tr>
<td>Siemens</td>
<td>Apogee</td>
<td>Siemens Building Technologies</td>
<td>Hayward, CA</td>
</tr>
<tr>
<td>Schneider Electric</td>
<td>Andover Continuum StruxureWare</td>
<td>EMCOR Integrated Solutions</td>
<td>Pleasanton, CA</td>
</tr>
<tr>
<td>Trane</td>
<td>Trane Tracer Summit BCU</td>
<td>Trane</td>
<td>Calgary, Alberta - Canada</td>
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<tr>
<td>Delta</td>
<td>ORCA</td>
<td>Cypress Semiconductor</td>
<td>San Jose, CA</td>
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Current Wireless Pneumatic Thermostat (WPT) Architecture

Notes:

WPT System Communicates via BACnet/IP to 3rd party Building Automation Systems (e.g. Johnson, Honeywell)

WPT System Communicates with Adura Technologies Wireless Lighting Controls via Adura XML-RPC interface, and converts to BACnet/IP objects.
Examples of how the WPT Provides Zone Visibility and Control through the GBC and other Building Automations Systems

Cypress Envirosystems GBC Interface

Floor view of WPTs in StruxureWare

Floor view of WPTs in Metasys

Detailed zone view of WPTs in Metasys
Corporate Customers

[Logos of various companies]
Education Customers

K-12 School Districts

- New York City, NY
- Limestone school district, IL
- East Hartford, CT
- Monroe, NY
- White Plains, NY
- Chisholm SD, MN
- De Smet Jesuit, MO
- Midland, TX
- West Bloomfield, MI
- Ottawa, Canada
- Loudoun, VA
- North Smithfield, RI
Commercial Real Estate Customers

- Colliers International
- Vornado Realty Trust
- Equity Office
- Grubb & Ellis
- CBRE
- Cushman & Wakefield
- AMRE
- Jones Lang LaSalle
- Knight Frank
- CIM
- Hines
- Alliance Commercial Partners
- Wells Fargo
- Northern Trust
- Associated Bank
- Bank of America
- Union Bank
- Google
- NVIDIA
- DPR Construction Inc.
- Fairmont Hotels & Resorts
- Marriott
- Lilly
- Gilead
- CBS
- San Francisco Chronicle
- Publishers Clearing House
- Cox Communications
- Chicago Tribune
NASA Ames Research Center

14 Buildings, 1,400 WPT’s in 1.5 million square feet
Authorized Channel Partners

GOLD CHANNEL PARTNERS

Honeywell
Process Solutions

Honeywell
Building Solutions

EMCOR

SUNBELT CONTROLS

Invensys

ACCO Engineered Systems

SILVER CHANNEL PARTNERS

TRANE

Azbil

Temperature Control Systems

G&O Thermal Supply Company

NAGASE

RSD

Refrigeration Supplies Distributor

Industrial Controls

Yorkland Controls Environmental Solutions
Survey Questions

Cypress Envirosystems Quarterly Customer Survey (Q3 2010)

Questions for Channel Partners

Question 1: How satisfied are you with the product quality?

Question 2: How satisfied are you with the product training and support?

Question 3: Would you recommend Cypress Envirosystems to your customers?

Questions for End-Users

Question 1: How satisfied are you that the system works as expected?

Question 2: How satisfied were you with the planning and installation process?

Question 3: Would you recommend Cypress Envirosystems to colleagues in your industry?
## Q3 Net Promoter Score – End Users

<table>
<thead>
<tr>
<th>Survey ID</th>
<th>Customer Type</th>
<th>Company</th>
<th>Location</th>
<th>Name</th>
<th>Date</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>621</td>
<td>End-User</td>
<td>Architect of the Capitol</td>
<td>DC</td>
<td>Ryan Ward</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
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<tr>
<td>614</td>
<td>End-User</td>
<td>Caterpillar</td>
<td>IL</td>
<td>Dave Van Natta</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
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<tr>
<td>605</td>
<td>End-User</td>
<td>CBS</td>
<td>NY</td>
<td>Tom Kane</td>
<td>10/26</td>
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<td>10</td>
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<tr>
<td>622</td>
<td>End-User</td>
<td>CBS</td>
<td>NY</td>
<td>Rich Hunter</td>
<td>10/27</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>609</td>
<td>End-User</td>
<td>City of Montreal</td>
<td>QC</td>
<td>Jacques Croteau</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>Better then I expected.</td>
</tr>
<tr>
<td>615</td>
<td>End-User</td>
<td>Clemson University</td>
<td>SC</td>
<td>Tony Putnam</td>
<td>10/26</td>
<td>7</td>
<td>6</td>
<td>7</td>
<td></td>
</tr>
<tr>
<td>616</td>
<td>End-User</td>
<td>Clemson University</td>
<td>SC</td>
<td>Matt Holbrooks</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>608</td>
<td>End-User</td>
<td>Central Michigan University</td>
<td>MI</td>
<td>Mike Walton</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>601</td>
<td>End-User</td>
<td>Genentech</td>
<td>CA</td>
<td>Barkley Flynn</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>620</td>
<td>End-User</td>
<td>Google</td>
<td>CA</td>
<td>Dan Cucoso</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>623</td>
<td>End-User</td>
<td>Google</td>
<td>CA</td>
<td>Anthony Ravitz</td>
<td>10/14</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>We really like the WPT, but have money for DDC now. Sorry.</td>
</tr>
<tr>
<td>617</td>
<td>End-User</td>
<td>Kaiser Permanente</td>
<td>CA</td>
<td>Paul Becker</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>You guys are one of our best vendors. Love Chuck Muncy.</td>
</tr>
<tr>
<td>611</td>
<td>End-User</td>
<td>LEVACS (Eli Lilly)</td>
<td>IN</td>
<td>Mark Peterson</td>
<td>10/26</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>610</td>
<td>End-User</td>
<td>Lilly Caribe</td>
<td>PR</td>
<td>Abel Gonzalez</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>602</td>
<td>End-User</td>
<td>Linear Technology</td>
<td>CA</td>
<td>Rick Pasquini</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>This system has greatly reduced the amount of time and guess work in troubleshooting our HVAC issues.</td>
</tr>
<tr>
<td>618</td>
<td>End-User</td>
<td>Santa Clara County</td>
<td>CA</td>
<td>Lin Ortega</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>619</td>
<td>End-User</td>
<td>Santa Clara County</td>
<td>CA</td>
<td>Alan Fusco</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>612</td>
<td>End-User</td>
<td>St. Joseph's Hospital</td>
<td>AZ</td>
<td>Walt Dubois</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>613</td>
<td>End-User</td>
<td>St. Joseph's Hospital</td>
<td>AZ</td>
<td>Tom Cottage</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>607</td>
<td>End-User</td>
<td>Stanford</td>
<td>CA</td>
<td>Tai Tran</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>604</td>
<td>End-User</td>
<td>Sunpower - F2 Scrubber</td>
<td>PHIL</td>
<td>Peter R. Remo</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>603</td>
<td>End-User</td>
<td>Sunpower - F2 WBM</td>
<td>PHIL</td>
<td>Michael Ecal</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>606</td>
<td>End-User</td>
<td>SunPower - Fab2</td>
<td>PHIL</td>
<td>Dennies Andal</td>
<td>10/26</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

| Total responses | 9 | 9 | 10 |
| Promoters       | 7 | 8 | 9  |
| Neutral         | 2 | 0 | 1  |
| Detractors      | 0 | 1 | 0  |

**End User Score** 78 78 90

**Aggregate Score** 50 73 78 (Combined End-User and Channel Scores)
## Q3 Net Promoter Score – Channel Partners

<table>
<thead>
<tr>
<th>Survey ID</th>
<th>Customer Type</th>
<th>Company</th>
<th>Location</th>
<th>Name</th>
<th>Date</th>
<th>Question 1</th>
<th>Question 2</th>
<th>Question 3</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>701</td>
<td>VAR</td>
<td>3V Chimica</td>
<td>Italy</td>
<td>Emiliano Vigna</td>
<td>10/26</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>Our customer is very happy. Real pleasure to work with you. Class operation.</td>
</tr>
<tr>
<td>723</td>
<td>VAR</td>
<td>ACCO</td>
<td>CA</td>
<td>Mike Ridout</td>
<td>10/26</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>712</td>
<td>VAR</td>
<td>HBS - Monroe</td>
<td>NY</td>
<td>Bob Garvey</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>707</td>
<td>VAR</td>
<td>HBS - WP</td>
<td>NY</td>
<td>Scott Anderson</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>720</td>
<td>VAR</td>
<td>Johnson Controls Inc.</td>
<td>CT</td>
<td>Jack Runyan</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>703</td>
<td>VAR</td>
<td>MEC - General</td>
<td>MI</td>
<td>Dan Bonfiglio</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>704</td>
<td>VAR</td>
<td>Parker Design &amp; Const</td>
<td>AZ</td>
<td>John Vigh</td>
<td>10/26</td>
<td>10</td>
<td>9</td>
<td>10</td>
<td>I am recommending Cypress everywhere!</td>
</tr>
<tr>
<td>724</td>
<td>Dist</td>
<td>RSD</td>
<td>CA</td>
<td>Dan Ginn</td>
<td>10/26</td>
<td>5</td>
<td>10</td>
<td>5</td>
<td>Need to fix BACnet issues and issue product bulletins</td>
</tr>
<tr>
<td></td>
<td>Dist</td>
<td>RSD - Gardena</td>
<td>CA</td>
<td>Jose Bravo</td>
<td>10/28</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>Awesome working with you.</td>
</tr>
<tr>
<td></td>
<td>Dist</td>
<td>RSD - Sacramento</td>
<td>CA</td>
<td>Tom Hardy</td>
<td>10/28</td>
<td>7</td>
<td>8</td>
<td>10</td>
<td>Version issues at Healthnet project.</td>
</tr>
<tr>
<td>716</td>
<td>Dist</td>
<td>SCI</td>
<td>QC</td>
<td>Pierre Longval</td>
<td>10/26</td>
<td>8</td>
<td>8</td>
<td>10</td>
<td>Official training for our staff is yet to come. Field support is terrific as far as I'm concerned. It really influenced the end user to take is</td>
</tr>
<tr>
<td>717</td>
<td>Dist</td>
<td>SCI</td>
<td>QC</td>
<td>Maurice D'Halewyn</td>
<td>10/26</td>
<td>9</td>
<td>8</td>
<td>10</td>
<td>The team effort to correct the problems described by my customers (city of Montréal) was impressive. No time was needed to fix the issues.</td>
</tr>
<tr>
<td>718</td>
<td>Dist</td>
<td>SCI</td>
<td>QC</td>
<td>Serge Descary</td>
<td>10/26</td>
<td>5</td>
<td>10</td>
<td>8</td>
<td>EXCELLENT SUPPORT FROM ROBERT BRILL AND ROBERT FALCONER</td>
</tr>
<tr>
<td>713</td>
<td>VAR</td>
<td>Silpac</td>
<td>CA</td>
<td>Mark Thornberry</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>719</td>
<td>VAR</td>
<td>Southampton-Trane</td>
<td>CA</td>
<td>Ghaudy Sanchez</td>
<td>10/26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>714</td>
<td>Dist</td>
<td>Wiles Legault</td>
<td>QC</td>
<td>Ron Gravelle</td>
<td>10/26</td>
<td>9</td>
<td>10</td>
<td>10</td>
<td>The delivery could be quicker. I have about 4 projects in the fire and hope they all go ahead. We also submitted a French version of the document.</td>
</tr>
<tr>
<td>715</td>
<td>Dist</td>
<td>Wiles Legault</td>
<td>QC</td>
<td>Conrad Lemieux</td>
<td>10/26</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td>710</td>
<td>Dist</td>
<td>Yorkland - General</td>
<td>ON</td>
<td>Gerry Cellucci</td>
<td>10/26</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>Web site should be easier to find how to install stats etc</td>
</tr>
<tr>
<td>711</td>
<td>Dist</td>
<td>Yorkland - General</td>
<td>ON</td>
<td>Larry Gravelle</td>
<td>10/26</td>
<td>9</td>
<td>9</td>
<td>10</td>
<td></td>
</tr>
</tbody>
</table>

| Total responses | 13 | 13 | 13 |
| Promoters       | 7  | 9  | 10 |
| Neutral         | 3  | 4  | 2  |
| Detractors      | 3  | 0  | 1  |

**"NPS" Score**

Cypress Envirosystems
First and foremost, the work performed by the professional team at Cypress Envirosystems was seamless. The installation was very precise and strategic, the training both clear and complete, the knowledge and understanding of customer needs concise and competent. As a business partner Cypress Envirosystems is top notch and I will refer and recommend to all my company peers the same. Thanks again for a job well done and the support and training that was second to none. Thanks again for a great job.

Lawrence Riviera
Honeywell Building Solutions

In just five days, we went from zero control of our heating and air conditioning, to total control. It was amazing how easy it was to calibrate each WPT after installation. Now we control set points for all thermostats remotely and have programs in place to control them according to all sorts of variables. We now have a true wireless EMS system. We can go online and see every zone and control each one remotely. The WPT system also gives us very powerful diagnostic tools and troubleshooting tools.

Paul Becker, Facilities Manager
Kaiser Permanente

We are excited about our new level of control on the 2 floors that were retrofitted!

Timothy D. Danz
Chief Engineer, The California Center
Cushman & Wakefield
San Francisco CA 94104

It was an outstanding and record setting installation of the wireless pneumatic thermostats and they are all working great. Everyone in the Dean’s Office is very happy and impressed. So far everything is great. Thanks for your efforts and please send my best regards to your colleagues.

Emir José Macari, Ph.D.
Dean of Engineering and Computer Science
California State University, Sacramento

The whole project, including installation, cost about $175,000 for retrofitting 350 thermostats,” says Ortega. “We made the deadline and received the PG&E incentive of $200,000. Talk about instant ROI. Plus, we figure that we are saving $42,000 per year on electric cost for just those two buildings. And then there’s maintenance. We used to be out there all the time tinkering with the system. Now we monitor it online. We figure our maintenance expense has been cut in half from $25,000 monthly to $12,500.

Lin Ortega, Utilities Engineering Program Manager
Santa Clara County, California

The new WPTs are working great. We now remotely control setpoints, set alarms, run diagnostics, perform zone control, and occupancy override. Of course, some of the tenants complain that they have lost control of their thermostats, but I point out that the university has a setpoint policy of 70 degrees for heating and 74 degrees for cooling. At night we go to 60 and 85 degrees. Thanks to the new WPTs, this is the first time we’ve been able to implement the policy in that building.”

Kirk Dillery, Energy Systems Specialist
Western Michigan University
Lighting Controls Retrofit
Easy Retrofit of Existing Fixtures

“Plus….sophisticated Enterprise Energy Management software designed to work with your lighting system to save energy”

<table>
<thead>
<tr>
<th>Strategy Employed</th>
<th>Savings Expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smart Scheduling</td>
<td>10-40%</td>
</tr>
<tr>
<td>Daylight Harvesting</td>
<td>5-15%</td>
</tr>
<tr>
<td>Task Tuning</td>
<td>5-20%</td>
</tr>
<tr>
<td>Presence Detection</td>
<td>25-50%</td>
</tr>
<tr>
<td>Personal Control</td>
<td>5-15%</td>
</tr>
<tr>
<td>Demand Management</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>50-75% (Blended)</strong></td>
</tr>
</tbody>
</table>
Energy Auditing & Continuous Commissioning
Cypress Envirosystems: Problems We Solve...

Need to save energy & improve uptime, but hindered by outdated facility?

Dial Gauges

Standalone Transducers, LED/LCD Displays

Pneumatic Thermostats

Steam Traps

-80C Freezers

Legacy Fluorescent Lighting

Manual Instrumentation, Not Programmable, No Diagnostics... Equals: Wasted Energy, Higher Downtime, More Labor Required
What is our Solution?

Non-invasive, easy retrofit, energy and labor savings, payback under one year

**Wireless Pneumatic Thermostat**
“Go from Pneumatic to DDC in minutes”

**Wireless Steam Trap Monitor**
“Avoid Expensive Steam Leaks”

**Wireless Gauge Reader**
“Remotely Read Gauges in minutes”

**Wireless Transducer Reader**
“Remotely Read Transducers – No Wires”

**Wireless Freezer Monitor**
“Predicts and Avoids Costly Freezer Failure”

**Wireless Light Controller**
“Reduce Electricity Use”
Energy Audits, Continuous Commissioning

- Chilled Water, Steam, Airflow are tough to measure in legacy buildings
- Most older Air Handler Units, Chillers, Boilers etc. are not monitored/automated
- Labor intensive to detect problems, check filters
- Manual gauges often the main means to check pressure, temperature, flow

Solution: Wireless Gauge Reader clamps on in minutes and transmits reading wirelessly to BMS/BAS

- No downtime, no wiring, no leak checks
- Alarm notification and condition-based maintenance

Enables Monitoring of Legacy Air Handlers for 70% Less Than Traditional Transducers
Wireless Steam Trap Monitor (WSTM)

- Necessary part of the steam distribution system, usually hundreds of units per site
- 15-20% average failure rate; leaks steam
- Failed traps lose $5,000 per year (1/8” orifice)
- Manual inspection typically done annually – labor intensive, do not catch problems in timely manner
- Solution: Wireless steam trap monitor detects faults and alarms on error, avoiding expensive leak loss
- Non-invasive installation: no breaking seals, wireless, integrates with BMS
- Battery life of 3 years at typical sample rates
- IP65/NEMA 4 rated for outdoor use
- 18 months payback on investment

Save Energy and Time Locating Faulty Steam Traps
How Steam Trap Monitoring Saves Energy

Without Steam Trap Monitoring

With Steam Trap Monitoring

Timely Detection and Correction of Trap Failures Avoids Prolonged Costly Steam Leaks

Typical savings for 1/8” orifice steam trap
WSTM Screenshot
Lilly Indianapolis, IN – Deploying 2,400 WSTM’s
Traversing Campus Wide Steam Distribution System

• Lilly Technology Center headquarters spans two city blocks

• Robust wireless network blankets large Tech Center complex to connect WSTM and other Cypress wireless devices

“Wireless is outstanding and will be a large competitive advantage to use the same platform for multiple applications” – Manager Steam Plant Operations
Extreme Environment

Cement bunker over 25 ft deep
Inaccessible “hot vault” traps at temperature up to 500 deg F
No hindrance in getting wireless signal back to the Blue Box and report condition data of the steam trap
Control Magazine, Dec 2010

Wireless Monitoring Delivers Fast Payback

Genentech checks steam traps and freezers to find energy savings and improve uptime.

by CHRIS STURBS

Genentech’s mission is to meet unmet medical needs, so one of the goals of our Corporate Facilities Services department is to operate our plant in South San Francisco as a world-class facility. The key focus area for achieving this goal is continuous improvement of facilities and maintenance systems to reduce operating costs. By driving down operating costs, more funds can be allocated to developing the product pipeline, and achieving the company’s mission.

The guiding principles for identifying and executing continuous improvement projects include:

- Improving plant asset management by implementing a performance-based maintenance strategy. Genentech has a well-established, institutionalized maintenance program. Transitioning to a performance-based strategy will also allow Genentech to predict equipment failure and understand an asset’s life cycle.
- Reducing energy costs, identifying methods to improve the efficiency of energy consumption will reduce energy costs and improve the bottom line.
- Improving uptime. Research and operations expect the facility and equipment to be functional and reliable. Any downtime in the facility directly impacts the bottom line. Corporate Facilities Services focuses on improving uptime and equipment reliability to help achieve the mission.

Steam Traps and Freezers

Consequently, we identified several assets that could benefit from its performance-based maintenance strategy to reduce energy costs or improve uptime. The first was steam traps. Genentech has an annual steam trap maintenance program. However, throughout the year, steam traps often fail. Steam loss from failed traps was estimated to cost the company hundreds of thousands of dollars annually. Steam trap failures could be prevented or found as they occur using a steam trap monitoring system, resulting in significant energy savings (Figure 1).

The second asset able to benefit from performance-based

Genentech, 2009

Implementation Savings Calculation (slide 12)

<table>
<thead>
<tr>
<th>Installed Units</th>
<th>Cost</th>
<th>Savings</th>
<th>Install Date</th>
<th>Savings Calculation</th>
</tr>
</thead>
<tbody>
<tr>
<td>95 Steam Traps</td>
<td>$42,000</td>
<td>$42,525</td>
<td>8/2006</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 – 1/4&quot; traps blown for 8 months, at $15/1000 lb = $210,000, $6/1000 lb = $54,000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 – 1/8&quot; traps, 500 lbs/1000 lb = $165,000, $8,750</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 Freezers</td>
<td>$20,000</td>
<td>$20,000</td>
<td>8/2006</td>
<td>$500/pair of 4 pairs at $200/pair = $20,000</td>
</tr>
<tr>
<td>4 Air Handlers</td>
<td>$4,800</td>
<td>$13,400</td>
<td>2/2006</td>
<td>3 air handlers with 4 pairs each, charged $1899 per year, reduced to 3 air handlers</td>
</tr>
<tr>
<td></td>
<td>1-1/4&quot; with 20 pairs/air handler, charged to air handler at 3 air handlers at $1899 per filter = $569, $184, $11</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 RO Monitoring</td>
<td>$18,000</td>
<td>TBD</td>
<td>2/2006</td>
<td>TBD, labor savings, troubleshooting, downtime savings</td>
</tr>
<tr>
<td>Points</td>
<td></td>
<td></td>
<td></td>
<td>TBD = labor savings, troubleshooting, downtime savings</td>
</tr>
<tr>
<td>5 Other Misc.</td>
<td>$6,000</td>
<td>TBD</td>
<td>2/2006</td>
<td>TBD = labor savings, troubleshooting, downtime savings</td>
</tr>
<tr>
<td>Devices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>$56,000</td>
<td>$75,925</td>
<td>8/2006</td>
<td>Payback of 14 months</td>
</tr>
</tbody>
</table>

More Case Studies with ROI on Website
Selected WSTM Users

- Genentech, Biotech – South San Francisco, CA
- Genentech, Biotech – Hillsborough, OR
- Eli Lilly, Pharmaceuticals – Indianapolis, IN
- Abbott, Pharmaceuticals – Campoverde, Italy
- Veneria Medical Center, Hospital – Milan, Italy
- VA Hospital, Hospital, Lebanon, PA
- UC Davis Medical Center, Hospital, Davis, CA
- Genel Makina, Boron Mine - Turkey
- InBev, Brewery – Wales, UK
- Cushman and Wakefield, Office building, San Francisco, CA

Upcoming VA Hospital Projects (VA Spec, already bid):
https://www.fbo.gov/index?s=opportunity&mode=form&id=2b0dc11b6ff9efdd969cbed6a487caa3&tab=core&cvview=1
https://www.fbo.gov/index?s=opportunity&mode=form&id=e958edc9a9b80a851ade16558bf9fdca&tab=core&cvview=1
Summary

• Retrofit for Commercial and Industrial Plants for Energy Efficiency and Auto-Demand Response

• Key Principles:
  - Non-Invasive, Clamp-on Devices Which Install in Minutes
  - Compatible with Existing Infrastructure
    • DDC Integration
    • No new training of staff
    • No new systems software

• Typical Payback of 18 Months or Less
Additional Backup Examples
## Reduce Energy Consumption: Compressed Air

### Customer Challenge:

Compressors, pumps and fans often run at settings beyond what is needed e.g. 125psi for Compressed Dry Air instead of 85psi, wasting >20% energy.

Operators lack monitoring so they don't reduce pressure – avoid risk of process upset.

Installing transducers is very time-consuming & disruptive for multiple air branches and can introduce leaks.

### WGR Solution:

Typically manual gauges are already installed throughout CDA systems or coolant loop systems.

WGR’s can monitor and alarm pressure/flow to ensure process integrity and reduce energy use.

App note available: “Compressed Dry Air System Energy Savings”

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Savings on 500hp Compressed Air System can be up to $100K per year, with a 8 month payback.
Improve Asset Health and Uptime

**Customer Challenge:**

Older equipment such as packaged heat exchangers, boilers, chillers, air dryers, hydraulic conveyors, water filters, HEPA filters, etc. often have little or no electronic monitoring outputs.

Adding new transducers require modifying the equipment package and may impact existing service/warranty agreements.

**WGR Solution:**

Typically manual gauges are already installed on older packaged equipment.

The WGR can monitor, trend and alarm parameters for early fault detection and corrective action.

**Case Studies Available:**

“Facilities Monitoring”

“Tri-State Power Asset Health Monitoring”

“In the first two weeks of using the WGR, we were able to detect and develop corrective measures for a potentially costly issue that we never suspected” – Mike Long, Control System Supervisor, Tri-State Generation and Transmission
Reduce Consumables Usage

Customer Challenge:

Gas cylinders (e.g. calibration gases), water filters, HEPA filters are often replaced at scheduled intervals rather than actual usage.

This results in more frequent changes than required, or results in downtime when not replaced in a timely manner.

Installing transducers may introduce leaks and require safety inspection.

WGR Solution:

Gas Cylinder regulators gauges, Magnehelic air flow gauges (for HEPA filters) are great examples of data which can be read and trended to optimize consumables use.

Reduces consumables cost, avoids downtime, and optimizes skilled labor.

Case Studies Available:
“Micrel Gas Management Savings”

We saved $215K per year on our 280 Gas Cylinders, a seven month payback.
– Ron Farry, Operations Manager, Micrel Inc.
Perform Faster Troubleshooting

Customer Challenge:

When excursions occur, technicians inspect many gauges and equipment in the hope of finding the source of the problem...but the relevant data was often not captured and is not available.

Often, data from different subsystems or equipment needs to be compared and time-indexed to identify the root cause.

WGR Solution:

The WGR may be permanently or temporarily installed to log data, and notify on excursions.

The time-indexed historical record helps reduce troubleshooting time and confidence.

Minimize Troubleshooting Labor and Downtime with Non-Invasive Data Logging of Historical Data
Customer Challenge:
Many facilities perform manual rounds to inspect equipment and log gauge readings.

Some gauges are in awkward locations or may pose safety risks - high up on column, near heat sources, under floor etc.

Accurately reading gauges “face-on” (without parallax) are sometimes difficult or impossible.

WGR Solution:
Wherever there is a gauge in a hard-to-access location that needs to be read, the WGR is a fast and low cost candidate to do the job.

Reduce likelihood of safety incidents due to reading gauges in hard-to-access locations.

“I’m not getting more engineers, so I need to have them working smarter…using the WGR”
- Pat Ireland, Operations Manager, Novellus Inc.