



Armstrong®

Intelligent System Solutions®

STEAM • AIR • HOT WATER

Welcome to Armstrong

Armstrong International
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Armstrong International, Inc.



Founded in 1900

Five Generations of Family Ownership and Leadership

Adam Elliott Armstrong
Lawrence F. "Army" Armstrong
Merrill H. "Gus" Armstrong
David M. Armstrong
Kurt Armstrong



Global leader in energy
and environmental
management



Specialists in utility optimization for process,
industrial, and institutional facilities



Global network of sales
engineers and energy training
facilities located in 60 countries



Operate 12
manufacturing
facilities located in
North America,
China, Europe,
Japan, India, Mexico
and Korea

Our Culture

We are guided by these Values

- Faith in God, Family, Job (in this order)



- Honesty
- Dignity
- Fairness
- Hard Working
- Respect
- Kindness
- Trust
- Fearless
- Loyalty

“90% of our global customers say they will repurchase and would also recommend to a friend”

Armstrong Promise

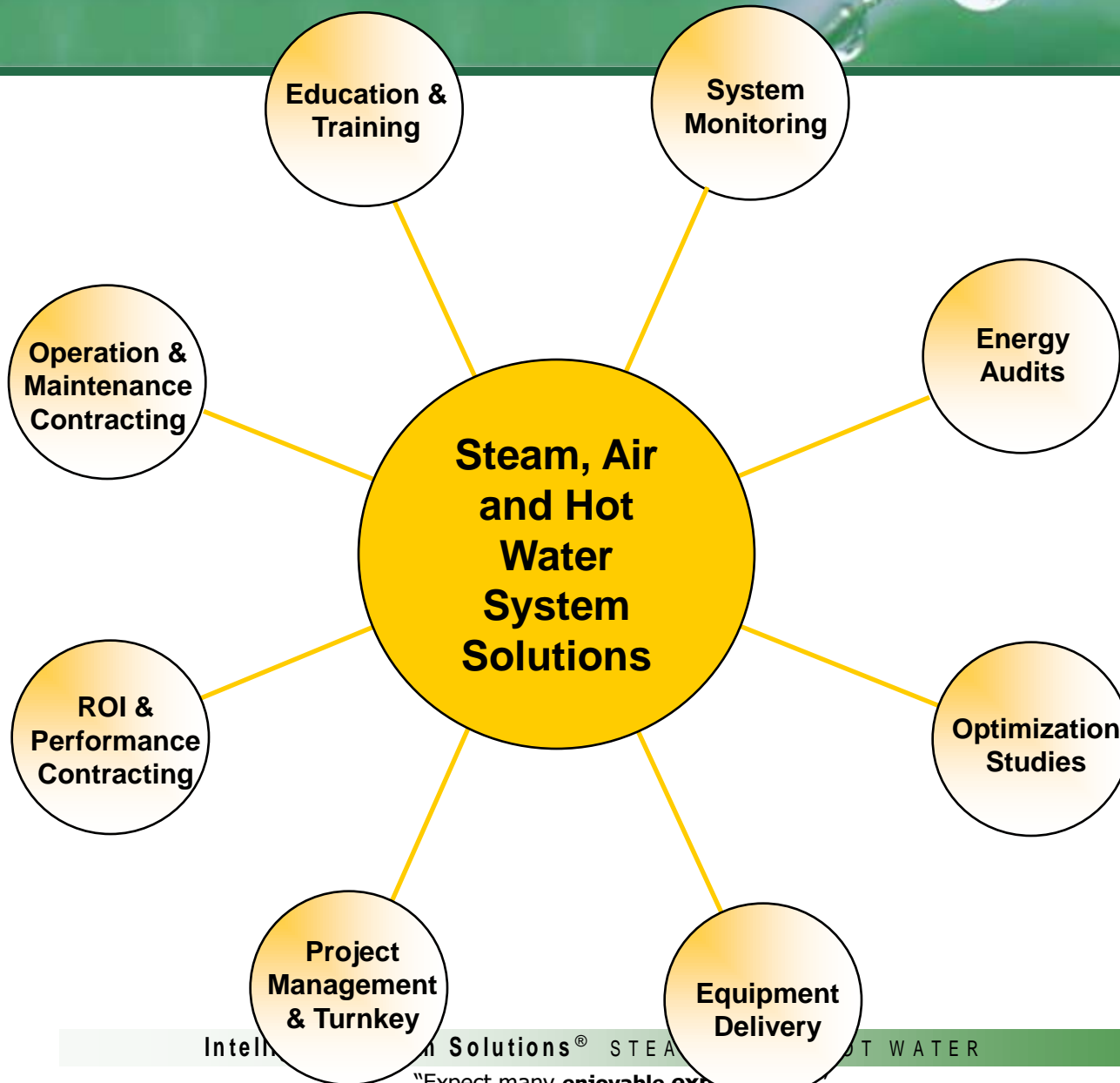
We provide intelligent system solutions that improve utility performance, lower energy consumption, and reduce environmental emissions . . . while providing an “enjoyable experience”!

Promise Kept....every second...

- Since 2004, when we authored the UN recognized methodology for steam system carbon trading....
 - Armstrong saves 1 ton of CO₂ every 13 seconds
 - Armstrong saves 1 ton of energy every 40 seconds
 - Armstrong saves 10 tons of water every 3 seconds

....globally....

Armstrong Solutions



Intelligent Solutions® STEAM, AIR AND HOT WATER

"Expect many enjoyable experiences."

David M. Armstrong



Typical Problems that we Solve



- **Steam Generation:** poor energy efficiency
- **Steam Distribution:** water hammers, leaking
- **Heat Transfer:** water hammers, corrosion, unstable temperature control, gasket leaking, poor energy efficiency
- **Hot Water:** unstable outlet temperature, legionella concerns, poor energy efficiency
- **Pressure & Temperature control:** frequent damages, unstable operation, noise level
- **Air Humidification:** frequent maintenance, unstable humidity rate, flooded air ducts
- **Trapping, Draining & Venting:** live steam losses, flooded applications, frequent maintenance
- **Condensate Return:** pumps maintenance, poor recovery rate, water hammers, flash steam losses

New Technologies from Armstrong

- Hot Water Solutions
 - The Brain[®] DRV80
- Humidification Solutions
 - HumidiClean[®] HC-6000
- Steam and Condensate Solutions
 - Double Duty[™]
 - Python[™] Control Valve
 - Wireless Steam Trap Monitoring

New Technologies from Armstrong

- Steam and Condensate Solutions
 - **Packaged Piping Solutions**
Designed to simplify and supply all the components (manifolds, steam traps, valves, etc.) necessary for your drip and tracer line applications.
 - Reduce Installation Costs
 - Easily Accessible
 - 3-year Guarantee



New Technologies from Armstrong

- Steam and Condensate Solutions

- **Double Duty™**

With the Double Duty steam Trap and Pump Combo, condensate is allowed to drain from the heat exchanger under all operating conditions, eliminating the stall problem and optimizing system efficiency.

The Armstrong Double Duty Series Steam Trap and Pump Combinations are:

- Low Maintenance
- Low-Profile
- Versatile



Double Duty™ 6



Double Duty™ 4

New Technologies from Armstrong

- Steam and Condensate Solutions

- **Python™ Control Valve**

When accurate control is desired from your steam or water applications, the Armstrong Python 1100 Series Control Valve will squeeze every bit of performance out of your system and deliver precise control.



New Technologies from Armstrong

- Steam and Condensate Solutions

- **Wireless Steam Trap Monitoring**

SteamEye® is a wireless steam trap monitoring system that detects a failed open or a failed closed steam trap; instantly alerting of failure.

- Reduce Maintenance Costs
 - Increase Energy Savings
 - Combat Shrinking Budgets



Steam Traps Characteristics

Method of Operation	Intermittent	Continuous	Intermittent	Intermittent
Energy Conservation (Time in Service)	Excellent	Good	Poor	Fair
Corrosion Resistance	Excellent	Good	Poor	Fair
Resistance to Hydraulic Shock	Excellent	Poor	Excellent	Poor
Vents air and CO ₂ at steam temperature	Yes	No	No	No
Operation against back pressure	Excellent	Excellent	Poor	Excellent
Resistance to damage against freezing	Good	Poor	Good	Good
Performance on very light loads	Excellent	Excellent	Poor	Excellent
Ability to handle dirt	Excellent	Poor	Poor	Fair
Mechanical failure (Open-Closed)	Open	Closed	Open	—



Energy Audits – System wide

Have conducted *thousands of system audits* that have recognized upgrade ideas saving millions of \$'s in energy at customer sites



Operations and Maintenance

Operate, maintain, and/or service multiple facilities globally that have lowered operational costs at each facility. Terms: 3-25 years

Service Solutions



Financed Optimization (specific projects)

Have *financed millions of \$'s of energy projects*



Turnkey Construction and Project Management

Have implemented *hundreds of turnkey energy conservation projects* where Armstrong provided the talent and manpower to install project ideas and mitigate cost overruns



Utility Monetization (utility asset ownership)

20 Global facilities owned and/or operated by Armstrong

“Knowledge not shared is energy wasted.”



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“Expect many enjoyable experiences!”

David M. Armstrong



**Knowledge Not Shared
Is Energy Wasted[®]**



Questions & Answers



Intelligent System Solutions® STEAM • AIR • HOT WATER

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David M. Armstrong