

# **ARMSTRONG**



**Sustainability is Profitable with Armstrong  
Energy Audit and Retrofit Solutions**

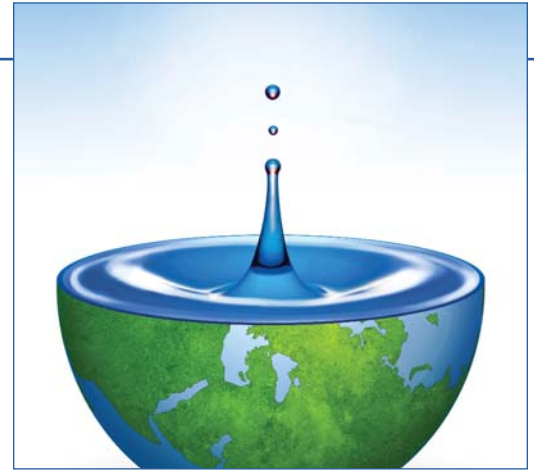
FILE NO:	100.15IN
DATE:	Dec. 15, 2010
SUPERSEDES:	100.15IN
DATE:	Nov. 05, 2009

# Green Clean Sustainable

## What is Energy Audit?

Energy Audit is a systematic study, or survey, to identify how energy is being used in a building or plant, and identify energy savings opportunities. Using proper audit methods and equipment, an energy audit provides essential information on where, how, and how much energy is used, so owners can analyze performance efficiencies at the overall plant or process level.

The Energy Audit itemizes improvement recommendations, describing the cost, savings, and payback, effectively giving managers a roadmap for future energy savings.



### ► Why Energy Audit?

Energy loss in any facility or industrial process is inevitable and the resulting economic and environmental impact is large, thus explaining the growing need for energy efficiency.

The level of energy efficiency a plant or process can achieve is inversely proportionate to the energy loss that occurs, the higher the loss, the lower the efficiency.

Overall energy losses in a plant can result from losses due to designs that do not incorporate energy efficient specifications, operations that run on inefficient methods and poor or non-energy efficiency-conscious maintenance programme. Reducing these losses will substantially increase the plant's efficiency. The data to identify and quantify the losses and subsequently suggest suitable techno-economic solutions to minimize the losses can be acquired through Energy Audits.

The Energy Audit focuses on specific areas of the site's energy system, such as pump & motor system, refrigeration, steam distribution, compressed air, venting system and natural gas boiler.

According to the U.S. Department of Energy, pumping systems account for nearly 20% of the world's electrical energy demand and range from 25 % to 50% of the energy usage in certain industrial plant operations.

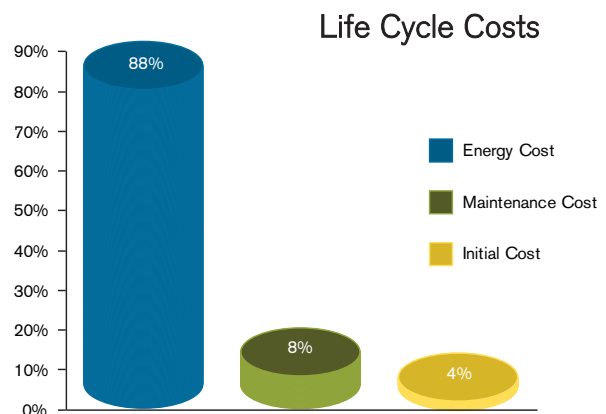
Studies have shown that 30% to 50% of the energy consumed by pump systems could be saved through equipment or control system changes.

### ► Life Cycle Costs

The purchase price of the typical pump is only 4% of its lifetime ownership cost. Maintenance costs represent approximately 8%. The rest, an enormous 88% of the lifetime cost of the pump, goes toward the energy to operate it.

A Finnish Technical Research Center report "Expert Systems for Diagnosis and Performance of Centrifugal Pumps" reveals that the average pumping efficiency, across the 20 plants and 1,690 pumps studied, was less than 40%, with 10% of pumps operating below 10%.

Pump over-sizing and throttled valves were identified as the two major contributors to this sizeable efficiency loss. Besides hindering overall plant efficiency, poor pump performance results in lower product quality, lost production time, collateral damage to process equipment and unnecessary maintenance costs.



## ► The Armstrong Energy Audit

The Armstrong energy audit provides an in-depth study of all the major energy consuming pumps and systems in the plant

- It involves exploring practically achievable energy saving measures through a systematic and scientific approach
- Sophisticated, portable instruments are used in measurement of various parameters related to the performance assessment, to realistically estimate the losses and potential for energy savings
- The study mainly focuses on improving energy usage efficiency and identifying energy saving and space savings opportunities
- The analyses includes simple payback calculations where investments are required to be made to implement recommendations, to establish their economic viability
- The study also provides sizing and selection of recommended retrofits



During the audit, continuous interactions between the Armstrong audit team and plant personnel allows for possible concurrent implementation to ensure that the suggestions made are realistic, practical and actionable.

## ► Armstrong can assist you in achieving:

- Increased energy efficiency
- Reduced energy and operating costs
- Improved profitability
- Maximized performance
- Reduced life cycle costs
- Increased production reliability
- Increased comfort of building occupants
- Reduced environmental impacts



## ► Retrofit Solutions from Armstrong

Armstrong offers high-value solutions suitable for retrofit installations in a wide range of applications. Our product solutions offer many benefits to contractors, owners and managers, including:

- Easy installation solutions for quick implementation of retrofit projects
- Integration with existing equipment
- Real time monitoring of energy savings
- Built-in redundancy where required
- Easy access to technical information

Our retrofit projects draw on our many strengths as an organization, including:

- Experience in building systems and packages
- In-house engineering capability for Energy Analysis, Design Assist and Project Assist
- Wide range of products and solutions
- Broad network of representatives and service dealers

# Reduced Energy and Operating cost

## ► Vertical Inline Pumps

Armstrong VIL pumps have been installed in thousands of applications all over the world and have demonstrated high performance, consistent efficiency, and maximum durability.

### VIL features:

#### ► Reduced Footprint:

- The VIL pumps are designed to be mounted directly into the pipeline without foot support. Base mounted end suction pumps and horizontal split case pumps require a large footprint. VIL pumps to reduce the floor space required.
- Vertical In-Line installations typically require 1/3rd of the space of horizontal pumps

#### ► Lower Installation Cost:

The Vertical In-Line becomes an integral part of the piping system. Flexible connectors, need grouting needs are eliminated. Mechanical piping to pump misalignment on floor mounted pumps, are eliminated.

#### ► Ease of maintenance:

- The VIL pumps include industry standard mechanical seals for long life and economical service. In the event of regular scheduled maintenance, the seal is easily replaced. The Armstrong mechanical seal has a Sintered Bronze Seal Ring, one of the most reliable seals in the market today.



akes it

## ► Design Assist

Design Assist is a unique service provided by Armstrong. Working with an existing design or concept, we re-design the system layout to deliver optimal efficiency, utilizing Armstrong technologies. Using the latest and most advanced design tools, we can help you turn up substantial savings in equipment, installation and lifecycle costs. In most instances the efficiency savings generated by the design assist service go well beyond what could be achieved through purchase of higher efficiency equipment alone. Armstrong has repeatedly saved huge amounts of money for our customers, by providing more efficient equipment placement, piping, and product selections.

### Design Assist Benefits:

- Provides customers with an optimal system layout.
- Product selections are based on in depth knowledge of component integration, and complete life cycle costs.
- Typically delivers savings on system components, floor spacing, piping, installation, energy efficiency and carbon footprint.



## ► Dual Vertical In Line Pumps

- The Dual Vertical In Line pumps design eliminates the need to install two pumps in duty / standby application saving on capital and installation cost
- The Dual Vertical In Line pumps become an integral component of the piping system. This configuration eliminates the need for flexible connectors, inertia base, grouting and field alignment.



# Efficient Cost Saving Solutions

## ► IVS Sensorless Pumps

- The Armstrong IVS Sensorless pump is designed to meet the need for energy-efficient pumping systems in today's buildings. Traditional fixed speed pumping systems, waste energy through crude throttling valve flow control. The Variable speed technology embedded in the IVS Sensorless pump allows the speed of the unit to be tuned to suit system demand.
- The IVS Sensorless pump is a new generation pump, completely integrated into a compact package. The Sensorless technology adjusts motor speed based on power demand, so pressure transducers/sensors are no longer required. This reduces the first installed cost of the system and makes it practical to use these IVS variable speed pumps in a retrofit installation.
- Applications for this technology include variable volume heating and chilled water applications. The design of the Armstrong IVS Sensorless pump goes beyond ASHRAE 90.1 standards, providing the benefits of variable speed technology.
- The IVS controller provides the operating cost savings of a traditional variable speed system, without the added installation expense and complexity of a remote pressure sensor. It is the first true plug-and-play intelligent pump on the market, available only from Armstrong.



## ► Booster Systems

- Designed to provide a reliable supply of water, the Armstrong Booster Systems is a compact, energy-efficient and easy to install.
- Available with constant speed control or variable speed with microprocessor control.
- Compact design for easy delivery to site and installation.
- Single source responsibility for the complete packaged system.
- Factory performance tested and certified.

## ► Ultra Efficient Chilled Water Integrated Plant Control (IPC 11550)

- The IPC 11550 system creates a new standard for HVAC system communications, with full remote control capabilities through web-based interfaces.
- In addition to helping predict equipment failures, the all variable speed IPC 11550 system helps avoid system failures, as operating at a lower speed will extend equipment life.
- "All variable speed" plant control offers the greatest opportunity for energy savings. Using the IPC 11550, annual average efficiency levels that are twice that of today's best in class systems can be achieved.
- The IPC 11550 system also provides secure remote plant assessment, easily downloadable plant data, operator assistance with plant alarms protocol translation between field hardware and the BMS, scalability for future plant extensions and the world's most user friendly touch screen interface.



# Proven Technology and Expertise

## ► Integrated Pumping System (IPS)

- Armstrong Integrated Pumping System (IPS) automatically ensures delivery of required pumping capacity to match key building loads, while maintaining pumping energy costs at a minimum.
- With the use of system load detectors such as differential pressure sensors, at one or more remote locations, the Armstrong IPS automatically and continuously provides just the required flow for current needs.
- HVAC system load requirements vary considerably during a typical day. Considerable energy savings result when pumping capacity is continuously matched to the load.
- Pumps may be operated as 100% standby or in a multiple pump, staged parallel sequence.
- Armstrong's IPS can control as many as six (6) pumps in parallel, with up to eighteen (18) remote system load sensors. Dedicated or shared Variable Frequency Drives (VFDs) may be used, with or without power bypass systems. Armstrong offers the most advanced IPS available, with the flexibility to meet the most demanding pumping applications



**S. A. Armstrong Limited**  
23 Bertrand Avenue  
Toronto, Ontario  
Canada, M1L 2P3  
T: (416) 755-2291  
F (Main): (416) 759-9101

**Armstrong Integrated Limited**  
Wenlock Way  
Manchester  
United Kingdom, M12 5JL  
T: +44 (0) 8444 145 145  
F: +44 (0) 8444 145 146

**Armstrong Design Private Ltd.**  
(Unit 1- Armstrong Manufacturing Center)  
490-L, 4th Phase, Peenya Industrial Area,  
Bangalore, India 560 058  
T: +91 (80) 4149 2832  
F: +91 (80) 4149 2831



© S.A. Armstrong Limited 2010

*For Armstrong locations worldwide, please visit [www.armstrongintegrated.com](http://www.armstrongintegrated.com)*