Institutional HVAC

CARLISLE POWER TRANSMISSION

Market Analysis and Information

DATE: 04/08/03

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Institutional HVAC Market Overview

Scope

Large facilities and institutions represent a tremendous opportunity for the sale of replacement and repair parts for Power Transmission components. One of the largest markets for this type of equipment is HVAC and Refrigeration systems. As of 1995, there were in excess of 4.5 million commercial buildings in the United States and with very few exceptions, all were users of air moving, heating and cooling systems of some type or variety.

One common thread in all types of building operations is the need for controlling costs and a fundamental goal of reducing operating expense over time. Energy utilization in the United States continues to increase annually and a significant opportunity exists to minimize the impact of increasing energy costs through the effective utilization of more efficient systems and system components.

The goal of this material will be to provide an understanding of potential opportunities and targets for sale of PT components, specifically higher efficiency belt drives. In addition, the types of equipment utilized in HVAC systems and an understanding of belt types and their attributes will be covered as well. The ultimate outcome will be to give the professional sales associate a working knowledge of market potential and opportunities and the basic knowledge of systems and components that allow him to effectively sell a more energy efficient drive to the user and have the user reap the benefit of lowered energy costs over time.

Institutional Opportunities

As stated previously, there are in excess of 4.5 million commercial buildings in the United States. Each of these facilities or structures can be viewed as a potential target for the sale of replacement belt drives as well as other PT components. In addition to replacement or service sales, each of these targets may lead to other opportunities by developing contacts within building service or maintenance services, building contractors, or facility managers.

Types of facilities include, but are not limited to, the following:

Facility or Institution	Number of Bldgs
Airports/Air Transport operations	11,445
Food Stores	171,057
Public Elementary/Secondary Schools	89,508
Private Elementary/Secondary Schools	27,402
Universities, Colleges, Professional Schools	4,064
Hospitals	8,841
Skilled Nursing facilities	15,032
Mental Health Care facilities	3,742
Warehousing operations	580,000
State/Federal Correctional facilities	1,500
Theaters	8,298
Bowling Centers	2,764

Other potential targets would be office buildings, military bases, shopping malls, large industrial complexes, amusement parks and large retail facilities.

Sales Contact Options

In most cases, the first or primary contact should be a building or facility manager, facility engineer or Maintenance manager. Many operations, depending upon the size and need will have their own maintenance staff, but more and more operations are contracting with outside mechanical or maintenance services due to cost containment goals.

Generally, a facility that has it's own staff or manager will have a higher degree of interest in energy reduction solutions as part of their goals and objectives may include cost containment or operating cost reduction criteria. Maintenance service contractors may be somewhat more focused on price and availability, but should still be open to new products that may increase their profit margins on service parts and adding to the value they provide their customers.

In some cases, the building or facility manager may be responsible or have a contract arrangement for service parts and either use their own staff or outside contractors to perform the maintenance. In other situations, the sourcing of service parts is part of the package provided by the contractor. In the latter situation, you would likely need to sell the concept for drive energy conservation to the manager and also sell and negotiate the actual product sale through the outside contractor as well.

No matter what type of facility you are targeting or the contract arrangements, a thorough understanding of HVAC equipment types, belt types and energy conservation approach will be needed to assure a successful sales approach for the customer.

Healthcare Facilities Overview

Healthcare Facilities represent approximately 5% of the total domestic commercial floorspace which is estimated to be 48 Billion square feet. This equates to roughly 2.4 Billion square feet nationwide of heated and cooled buildings. The following figures from Industrial Marketing Information (I.M.I.) give a view of the breakdown of those facilities.

Skilled Nursing Care	14,648 units
Intermediate Care Facilities	4,527 units
Nursing and Personal Care	9,868 units
General Medical/Surgical Hospitals	8,841 units
Psychiatric Hospitals	1,345 units
Specialty Hospitals	4,515 units
TOTAL U.S. Healthcare	43,744 Facilities

While healthcare facilities represent 5% of total commercial floorspace, they represent almost 11% of total commercial energy consumption in the U.S. making them an extremely energy intensive market. They utilize 62 billion kWh (211 trillion Btu) on an annualized basis. HVAC usage represents about 18% of that energy consumption which equals approximately 11 Billion kWh. At $.0722 per kWh (US DOE 2000) this represents an annual electricity expenditure in excess of $794 Million for the industry.

Healthcare HVAC Belt Drive Assessment

Total Market Estimation

There is unfortunately no definitive data source that specifically tracks HVAC or HVAC belt drive sales to the healthcare industry. It is a market with numerous channels and options for placing both OEM equipment and service for that equipment into place. While some hospitals or healthcare operations may purchase and carry belt inventory for the purpose of service, this is but a small piece of the total market size. Belt Sales directly to the healthcare industry total just under $1,500,000 per year which would equate to only $34 per facility (based on the total of 43,744 facilities). It is very likely that this represents only 10% or less of actual annual belt usage by the healthcare industry. The balance would be sold to HVAC OEM Manufacturer's, mechanical and electrical design and build firms and mechanical/electrical service contractors. Utilizing averages by facility is also quite misleading. There is a wide range of facility sizes from small private healthcare operations that may only be 10-20 bed facilities and under 25,000 square feet of floor-space up to the massive health facilities including standard hospital operations, medical office complexes and rehabilitation centers that can exceed 2 million square feet. It is quite obvious that the majority of larger HVAC systems and therefore, belt opportunities exist in the 50,000 square foot and larger arena.

By applying some common sense and reasonable assumptions against known data, a realistic estimate of total market size can be determined.

Fact:	Total Belt Sales to HVAC OEM Manufacturer's equals approximately $40,000,000
Assumption:	Belt sales are weighted more heavily to commercial systems than residential—use 75%
Conclusion:	Belt sales for Commercial HVAC systems = approximately $30,000,000

Fact:	Healthcare utilizes 5% of total commercial heated and cooled floorspace
Assumption:	Healthcare likely receives 5% of total Commercial HVAC systems
Conclusion:	Healthcare OEM HVAC Annual Belt market is $1,500,000

Estimate: Assuming an average Life Cycle of 20 years for major HVAC OEM components, This would equate to an approximate total market size of $30,000,000 for belts on Healthcare HVAC systems. There are obviously facilities that shut down and go out of service as well as equipment that fails, but for the purpose of this estimate, it is assumed that both are either replaced by new facilities, expansion to existing facilities or new equipment sales. The healthcare industry is growing fairly steadily so it can be assumed this may be a conservative estimate.

HVAC Drive Belt Replacement Estimate

If the total available market for replacement at any point in time is approximately $30,000,000, what percentage of that market is replaced annually. The healthcare industry and particularly primary Hospitals and extended care operations are generally very focused on preventative maintenance and extraordinary equipment care and management. For this reason, the replacement cycle is likely much higher in this industry than what you would normally experience in a typical industrial or manufacturing environments. The standard operational life of a typical v-belt is targeted at 25,000 hours, which running on a full time basis would equate to approximately 2.9 years. The duty cycles for HVAC equipment for larger healthcare facilities would likely be based on 24 hour operation, but at intermittent levels. Many Healthcare PM programs target one year replacement cycles to avoid possible equipment breakdown due to the critical nature of air conditioning and air movement in this industry.

For the purpose of this estimate, the following assumptions will be made:

30% of the total available market is changed on an annual basis
30% is replaced on a 2 year basis
20% is replaced on a 3 year basis
10% is replaced on a 4 year basis
10% is replaced on a 5 year basis

Based on these assumptions, the Annual HVAC replacement market for the healthcare industry is $16,850,000.

Hospital HVAC System Examples

Johns Hopkins Medical Campus, Baltimore Maryland

Added a 600,000 square foot expansion and utilized 2 Trane 2400 ton Chillers to accommodate the additional cooling requirements.

Carilion New River Valley Medical Center, Radford, VA

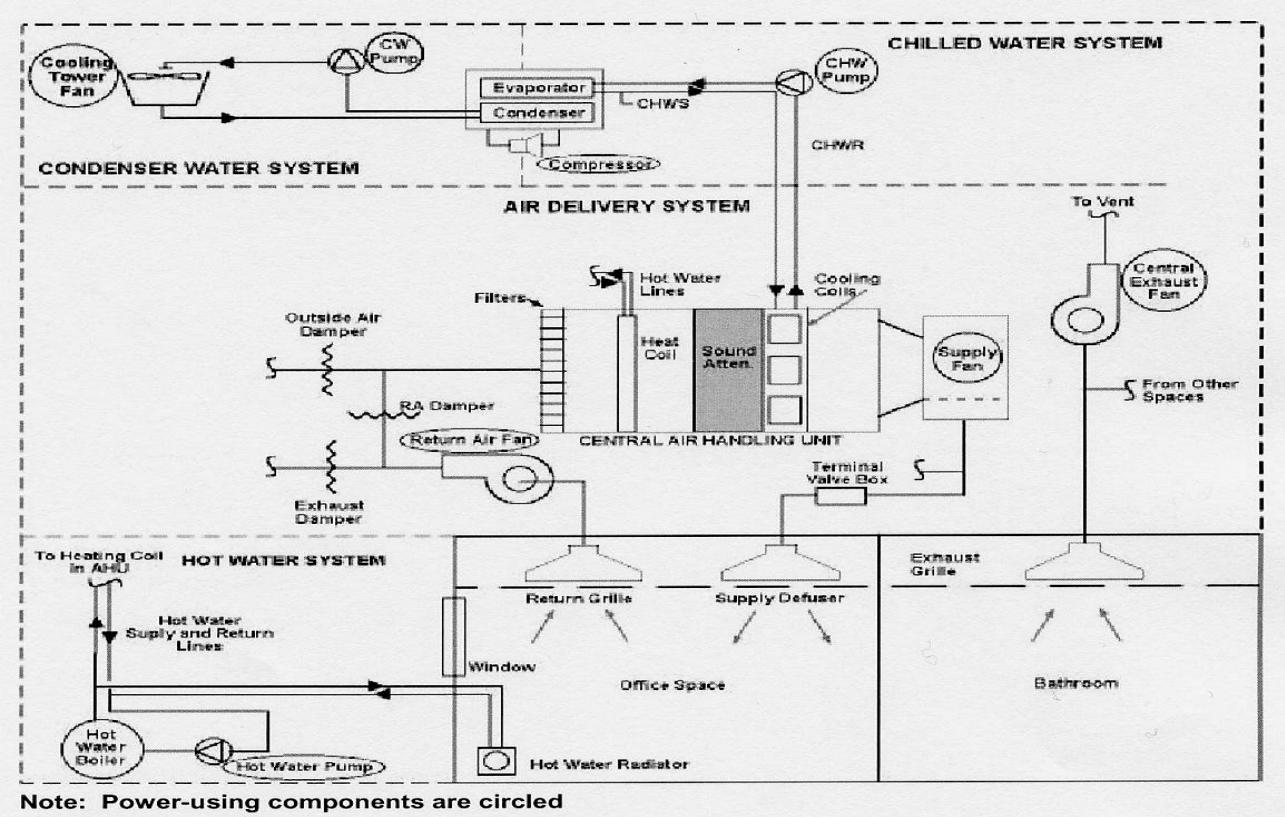
The existing facility was 150,000 sq ft. A new facility was built incorporating and renovating the existing building and adding floor-space to bring total square footage to 249,000 sq ft.

The new system went with a remote HVAC plant that incorporated 2 Trane CVHF 600 ton centrifugal chillers, 18 Modular air handlers and 440 “Varitrane” VAV (Variable Air Volume) boxes.

Desert Samaritan Medical Center, Mesa, AZ

The existing facility was 550,000 square feet. A 170,000 sq ft expansion was added and the HVAC system upgraded for the existing facility. A total of 16 Large Capacity Trane Air Handlers were put into service, 8 for the addition, 7 for the surgery tower, and 1 for the labor/delivery area. These units ranged from 11,500 cfm to 27,000 cfm. Assuming each of these units required a supply and return fan drive, this would total 32 drives just for this equipment alone.

HVAC System Overview



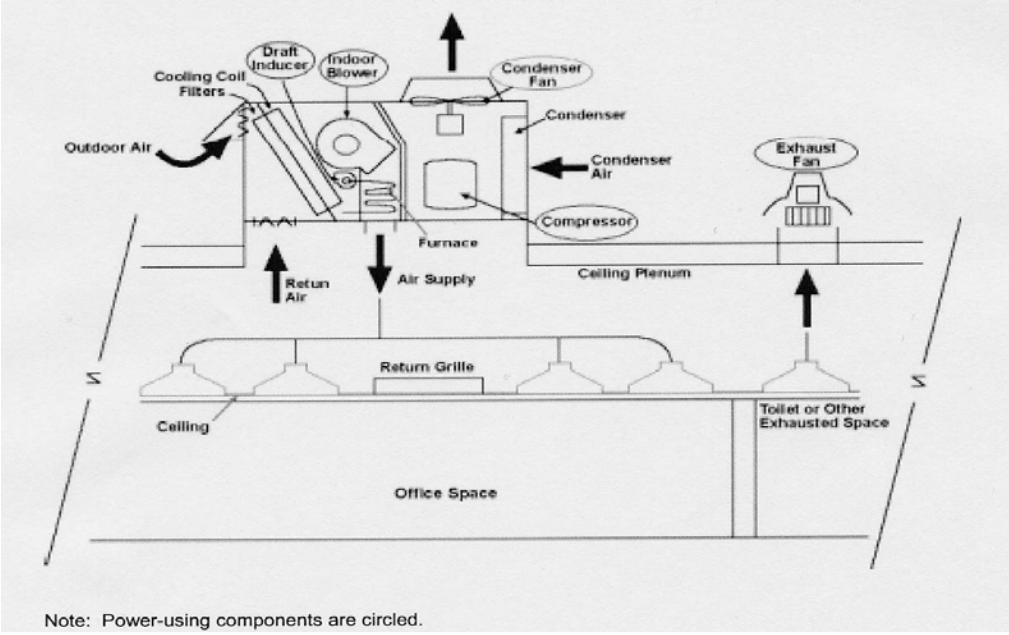
Types of HVAC Systems

There are four general categories of systems utilized in commercial buildings:

1) Central systems: chilled water system generated through use of a chiller which is then distributed to air handling or fan-coil units (See schematic above). This type generally refers to any system using chilled water as a cooling medium. Components included would be air-cooled chillers and cooling towers to reject heat. Heating is usually generated from a boiler and piped hot water or steam. Distribution of cooled air is then handled by VAV (Variable Air Volume) air handling units, CAV (Constant Air Volume) units or fan-coil units (small un-ducted cooling units)
2) Packaged systems: Utilize Rooftop units or split systems which contain direct-expansion cooling coils and heat rejection is remote from the cooled space. They are generally either unitary systems such as rooftop systems or split systems. Cooling in this scenario is delivered directly to the supply air through the use of a refrigerant evaporative coil and no chilled water is used. Packaged units are

HVAC System Overview

designed as heat pumps and will include either a gas furnace or electric resistive heating coil. Heat pumps operate utilizing the refrigeration system to pump heat from the outdoors into the building. See schematic below for a typical "packaged" system.



3) Individual A/C Systems: refers to smaller window or wall type mounted units which are self contained and allow for more individual control. Cooling is handled inside and heat rejection outside.
4) Un-Cooled Systems: Either no air handling or heated system only.

Air Handling Units—Rooftop

Air handling units such as the type shown are used in central HVAC systems to move and condition air which is supplied to the targeted conditioned spaces. Typical components of this type of system include mixing dampers, , filtration, fan assembly (including pulleys, belts and drive motor) and heating/cooling coils.

Some units may be manufactured in modular sections, with a separate fan component, filtration section and terminal units.

Cooling Towers

Cooling Towers are used in large HVAC applications as a method rejecting chiller condenser heat by cooling the condenser water. Cooling towers are classified as either open or closed systems. Open towers function by having the condenser water directly contacted by cooling air. In a closed system, the condenser water is transferred and cooled through a piping system. The majority of HVAC applications utilize Open type systems. As shown, the fan system in this unit operates off a single motor utilizing belts to drive the fans. Condenser water is distributed over packing within the tower so that it flows in thin films. The water is then cooled through air movement and evaporation. Condenser water systems thus require a fresh supply of water.

The Unit shown is manufactured by Baltimore Air Coil (Model FXT) and ranges in models from 6 to 536 ton units. It utilizes an axial fan system.

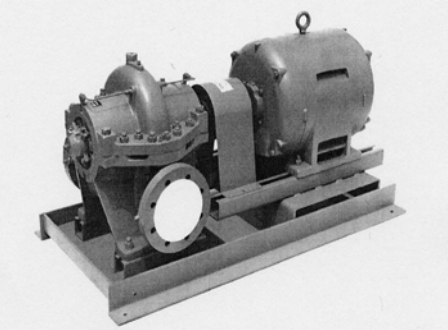
Belt Drive Rooftop Exhaust Fan

This unit is a typical type of fan used in many applications. It can generally be used for flat roof buildings with a limited number of floors. Large facilities which are single floor and large square footage operation may utilize many of these units. It is mounted easily on a roof to the top of an exhaust riser. Advantages of this system include limiting the requirements for additional mechanical room space and also creating negative building pressure which minimizes or eliminates contamination of indoor air quality by leakage of exhaust air.

The Unit shown is manufactured by Loren Cook Mfg.

Pumps

HVAC Systems utilize pumps for circulation of water (or water/glycol) or for water transfer in a system. The unit show is a split case horizontal type and is utilized in many larger applications requiring greater than 1000 gallons per minute of circulation. Other types of pumping units would include in-line centrifugal and end-suction models.



Chillers

Chillers systems are a key component of most air-conditioning systems. Their function is to remove heat from a building. Refrigerant-based chillers, which are the most common type, work like your fridge, in that they draw heat out of something at a low temperature and reject it at a higher temperature. Chiller efficiency is normally measured by the "Coefficient of Performance" or COP. This is the ratio of cooling achieved to energy input, and is generally in the region of 3 - three units of cooling for every unit of energy input. Chillers come in a variety of shapes, forms and *configurations. In all cases though there will be something being chilled - normally water - and somewhere where heat is being dumped, typically cooling towers.*

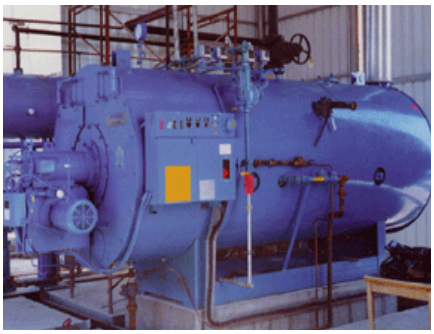
Unit Shown is A Trane Chiller (Santa Clara University)

Boilers

A boiler burns fuel to produce heat, which is absorbed by water flowing through tubes inside the boiler. Gas boilers operating at 70-85°C water temperature are the most common type of boiler in office buildings.

Typically a good gas boiler will operate at around 75% average efficiency.

Unit shown is a Shipley Boiler



Outdoor Air Cooled Condensing Units (Multiple Compressors)

THE CONDENSER in a system is a heat exchanger that generally rejects all the heat from the system. This heat consists of heat absorbed by the evaporator plus the heat from the energy input to the compressor. The compressor discharges hot, high-pressure refrigerant gas into the condenser, which rejects heat from the gas to some cooler medium. Thus, the cool refrigerant condenses back to the liquid state and drains from the condenser to continue in the refrigeration cycle. Evaporative type condensers generally are larger and contain a spray system and pump also.

Fans and Blowers

One of the most common belt using components in HVAC systems are fans and blowers. There are a variety of fan types and styles designed specifically for the multitude of potential applications. They can be used for air intake, air exhaust, to blow air across coils and even for simple air movement within a defined space (portable type). The two most common types of fans are centrifugal and axial fans.

Centrifugal Fans

Centrifugal fans operate very much like a pump with chamber enclosed rotating blades. Centrifugal fan usage would normally be in ducted systems for supply or extraction type air flows.

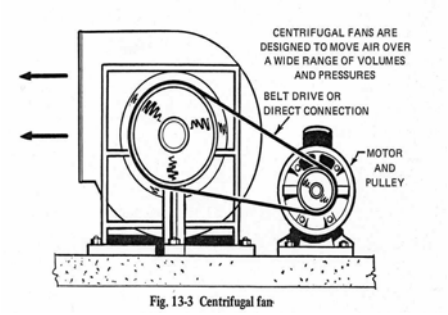


Fig. 13-3 Centrifugal fan

Axial Fans

Axial Fans operate basically like having a propeller located within your ductwork. Axial Type fans are more for point of use systems such as localized extract fans.

There are numerous other types of fans, including material handling, dust collection, etc. but in general this is an excellent target for not only belt drive service and replacement, but other service components as well (motor parts and service, bearings, pulleys).

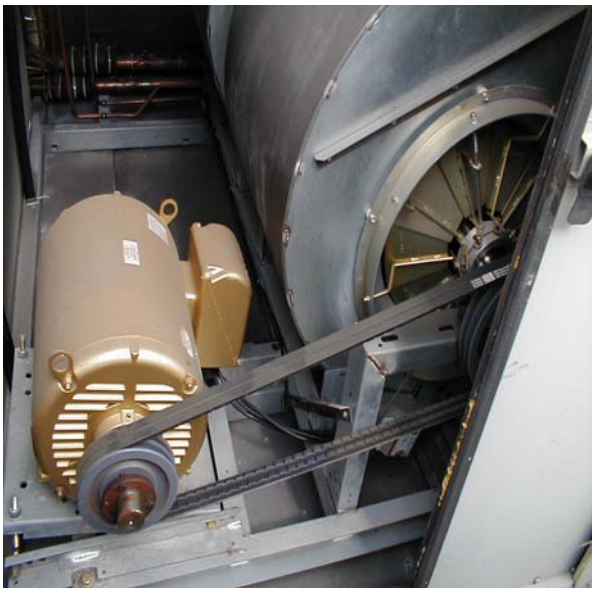
Major HVAC Equipment Manufacturers

As you look through the prior applications, it is quite obvious that there is a multitude of equipment types and sizes as well as manufacturers. Some of the manufacturers you may see include the following (definitely not an all inclusive list)

Trane	York
Carrier	Lennox
Penn Fan	Hartzell Fan
New York Blower	Barry Blower
Liebert	Greenheck Fan
Loren Cook	Baltimore Air Coil
Evapco	York-Shipley
Acme Fan	Lau Industries
Twin City Fan	Emerson Climate Technologies

At best estimate there are some 247 manufacturers of HVAC equipment. Many of them very specialized in terms of the type of equipment they manufacture. Quite a few of the manufacturers also focus on control systems which we have not investigated for the purpose of this report.

One common factor in all of these systems and types of equipment is the fact that a large majority of it is belt driven. By understanding where to look for the opportunities and a basic understanding of belts and drives you are able to provide a true value and valuable service to your customers.



Other HVAC Power Transmission Components

Obviously, belts are not the only opportunity for sales potential within institutional HVAC applications. However, by being knowledgeable about the equipment and drives and by selling a value added system for energy savings, these additional opportunities will be much more accessible.

Component

HVAC Motors
Unit Bearings
Motor Accessories
(Capacitors, Bases, length adaptors)

HVAC Controls
Heating Equipment
Refrigerating Equipment and Access.
Air Treatment
(Humidifiers, Air Cleaners/Filters)
Industrial and Commercial Fans
Power Roof Ventilators
Blowers

Belt Drives and Energy Efficiency

It has been estimated that Heating, Ventilating and Air Conditioning consume between 40 to 60 percent of the total energy used in most commercial buildings. As such, these systems represent a tremendous opportunity to have significant impact on building operational cost through improved energy efficiency.

Many of the HVAC and Motor manufacturers have undertaken initiatives to improve energy efficiency through improved fan design, tighter tolerance motor specifications, and improved sealing methods to reduce air volume losses. One area that may sometimes be overlooked is the belt drive and the opportunity it represents.

Many manufacturers original equipment tends to standardize on traditional wrapped classical, FHP (fractional horsepower) or banded belts. These belts are generally designed for long life (usually in the area of 25,000 hours), high load or horsepower capability and smooth running. One of the design criteria of a wrapped belt is also it's ability to slip somewhat on startup which tends to compensate for high starting torque or load, which can sometimes vary from 1-1/2 to 3 times the normal running torque of a motor.

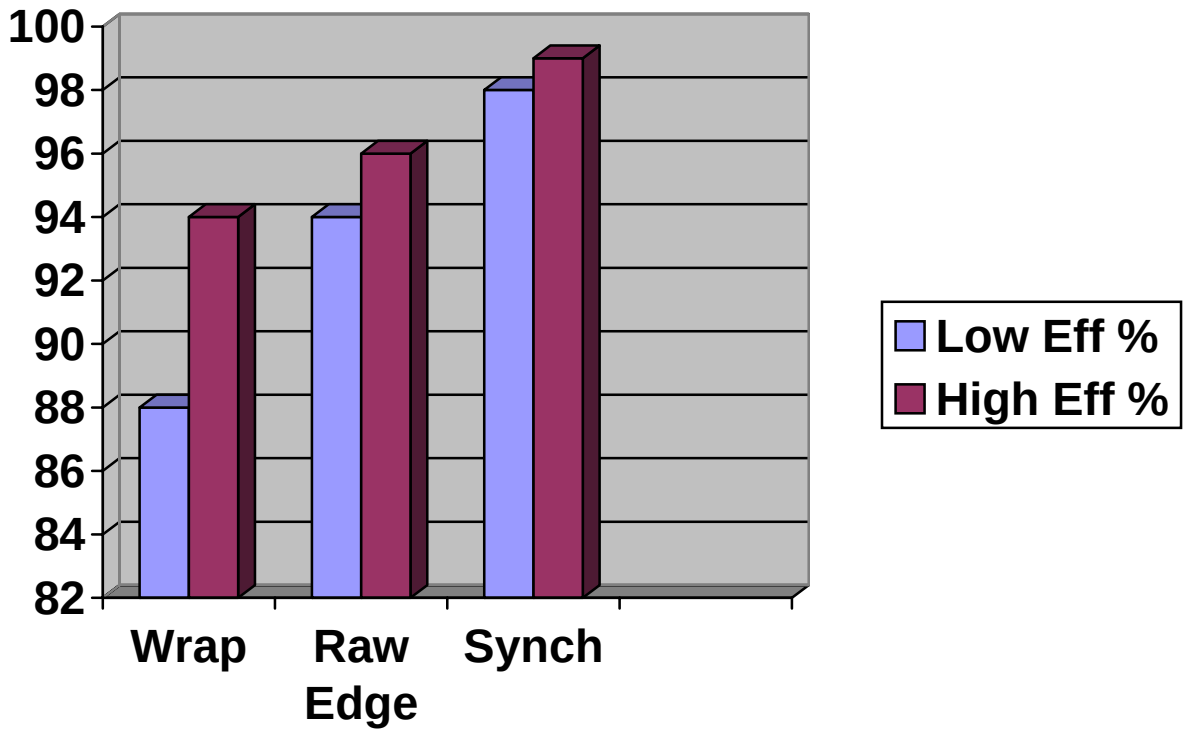
While these belts will provide exceptional performance on a drive, they generally have an overall efficiency rating of between 88 to 94% which equates to a performance and energy loss of between 6 to 12 percent. This is unfortunately a potential savings that is overlooked when doing system design or system maintenance.

There are 2 other types of belts that can offer the same benefits of a standard wrapped belt, while at the same time offering higher drive efficiency. Raw Edge Cog classical belts (Carlisle Gold Label Cog) are designed with Neoprene rubber sidewalls which tend togrip the walls of the pulley better than a wrapped fabric cover belt. They have cogs to improve flexibility, which causes the belts to run cooler on a drive and thus increase overall belt life. They have higher strength cord, which is capable of handling as much as 30% higher load than standard belts which compensates for the initial high start-up torque. Gold Label Cog belts generally have efficiency capability in the range of 94 to 96%, which can equate to as much as 8% greater efficiency compared to wrapped cover belts. While the initial cost of this belt is higher than a standard wrapped belt, the savings on drive operation over the course of a year pays back that initial investment many times over. One excellent aspect of utilizing Carlisle Gold Label Cog belts is that they drop right into your existing pulleys if you were using a wrapped cover classical belt previously. Immediate energy savings simply by switching out the belt.

The second type of belt provides the ultimate in belt drive efficiency. Synchronous belts (Carlisle RPP+Plus or Carlisle Panther Ultra-Cord) generally provide 98 to 99% Drive efficiency due to their tooth-in-mesh design. There is no slipping to deal with which gives you the maximum energy savings you can achieve with a belted drive. Most HVAC drives are not equipped with synchronous drives as original equipment, so you will normally need to change out not only the belt but the pulleys as well. While this is a much more expensive initial investment, there is generally a significant payback here that easily justifies the expense over time.

In one instance, this changeover was performed at a Las Vegas Casino and they are now realizing approximately $80,000 per year annually in energy cost savings. The opportunities and the savings are real and this becomes a win – win for both the salesman selling the belts and drives as well as the consumer. It is a fantastic way for the professional sales associate to build a strong and useful relationship with his customers.

Belt Drives and Energy Efficiency



While synchronous belts provide the highest energy efficiency rating, they may not be suitable for all drive types. Some drives that are running in extremely abrasive environments, that may be subject to high hub loads, or that may have mis-alignment issues may be better suited for the Gold Label Cog raw edge. Looking for these types of issues and gaining an understanding of drive design will help the salesman select the proper drive for his customer.

Sales Approach—Belt Drives and Energy Efficiency

The easiest sale will generally be the Gold Label Cog as the cost differential is merely a slightly higher priced belt that still yields good energy savings.

The best sell will be to give the customer maximum drive cost savings over time by changing over to synchronous drives. As Pulleys or sheaves get a little older (in the 3-5 year range), they tend to start wearing down in the sidewalls causing a "dishing" out effect. This further reduces the drive efficiency and creates energy loss. If your customers application has older sheaves, this may be the ideal time to convert his drive to synchronous as he would need to spend the money anyway. Convince him to spend the money on sprockets and a new synchronous drive and get the most return he can achieve!

Actual Drive Examples

In order for you to sell a facility or maintenance manager, it's necessary to have potential savings estimations to emphasize the value of your proposal. The following represents 3 drives, a 25 HP, a 50 HP and a 100 HP belt application. The parameters of the drive are shown as well as the assumptions for Kilowatt hour cost and motor efficiency. The first column under each example shows anticipated drive cost for a drive utilizing a standard wrapped classical (or possibly FHP) belt such as Carlisle Super Blue Ribbon. The second column shows drive cost, savings and payback for switching to a Raw Edge Classical (Carlisle Gold Label Cog) and the last column shows the even more dramatic results utilizing synchronous (Carlisle RPP Panther).

Drive Examples on Following Pages.

Sales Approach—Belt Drives and Energy Efficiency

DRIVE No. 1

DRIVER: 25 HP / 1800 RPM Nema B Electric Motor
DRIVEN: 900 RPM Centrifugal Fan
CENTER DISTANCE: MIN: 45 Inches MAX: 46 Inches
Motor Efficiency: .90
Electric Rate: $0.075 / Kwh
Drive Operation: 7200 Hrs. per Year
Annual Kwh: 149,200 (Motor HP x .746 x Hours/Yr)

WRAPPED V-BELT DRIVE

4 pcs. BP115 Super Blue Ribbon V-Belt
1 pc. 4BQ54 QD Sheave w/ SD Bushing
1 pc. 4BQ110 QD Sheave w/ SK Bushing
Drive SF = 1.37
Intitial Drive Cost: $ 159.04 *

Drive Sell Price: $ 387.93 **

GP $$$ = $228.89

* FSP Distributor Pricing
** Ind. Consumer Pricing

Annual Drive Cost* : $ 11,190.00
* Based on 90% belt efficiency

GOLD LABEL COG-BELT DRIVE

4 pcs. BX115 Gold Label Cog-Belt
1 pc. 4BQ54 QD Sheave w/ SD Bushing
1 pc. 4BQ110 QD Sheave w/ SK Bushing
Drive SF = 1.69
Intitial Drive Cost: $169.18 *

Drive Sell Price: $418.38 **

GP $$$ = $249.20

* FSP Distributor Pricing
** Ind. Consumer Pricing

Annual Drive Cost* = $10,687.00
* Based on 94.5% belt efficiency
Annual Drive Savings: $503.00
Belt Drive Premium: $30.45
Payback / Months: 0.72 months

RPP PANTHER BELT DRIVE

1 pc. 2800 PTH8M-35 Panther Belt
1 pc. 40PTH8-35 w/ SF Bushing
1 pc. 80PTH8M-35 w/ SF Bushing
Drive SF = 2.14
Intitial Drive Cost: $246.60 *

Drive Sell Price: $ 583.22 **

GP $$$ = $336.62

* FSP Distributor Pricing
** Ind. Consumer Pricing

Annual Drive Cost* = $10,183.00
* Based on 99% belt efficiency
Annual Drive Savings: $1,007.00
Belt Drive Premium: $195.29
Payback / Months: 2.3 months

Sales Approach—Belt Drives and Energy Efficiency

DRIVE No. 2

DRIVER: 40 HP / 1200 RPM Nema C Electric Motor
DRIVEN: 600 RPM Roof Ventilation Exhaust Fan
CENTER DISTANCE: MIN: 60 Inches MAX: 62 Inches
Motor Efficiency: .91
Electric Rate: $0.075 / Kwh
Drive Operation: 7200 Hours per Year
Annual Kwh: 236,100 (Motor HP x .746 x Hours/Yr) / motor efficiency

WRAPPED V-BELT DRIVE		GOLD LABEL COG-BELT DRIVE		RPP PANTHER DRIVE	
5 pcs. BP158 Super Blue Ribbon V-Belt 1 pc. 5BQ74 QD Sheave w/ SF Bushing 1pc. 5BQ154 QD Sheave w/ SF Bushing		5 pcs. BX158 Gold Label Cog-Belt 1 pc. 5BQ74 QD Sheave w/ SF Bushing 1pc. 5BQ154 QD Sheave w/ SF Bushing		1pc. 4326PTH14M-20 RPP Panther Belt 1 pc. 56PTH14-20 Sprocket w/ E Bushing 1 pc. 112PTH14-20 Sprocket w/ E Bushing	
Drive SF = 1.34		Drive SF = 1.43		Drive SF = 2.13	
* Initial Drive Cost:	$ 271.01	* Initial Drive Cost:	$ 288.28	* Initial Drive Cost:	$ 478.83
**Drive Sell Price:	$ 660.83	**Drive Sell Price:	$ 712.63	**Drive Sell Price:	$ 1,117.08
GP $$$	$ 389.82	GP $$$	$ 424.35	GP $$$	$ 638.25
* FSP Distributor Pricing ** Ind. Consumer Pricing		* FSP Distributor Pricing ** Ind. Consumer Pricing		* FSP Distributor Pricing ** Ind. Consumer Pricing	
+ Annual Drive Energy Cost: + Based on 90% belt efficiency	$ 17,707.00	+ Annual Drive Energy Cost: + Based on 94.5% belt efficiency	$ 16,910.00	+ Annual Drive Energy Cost: + Based on 99% belt efficiency	$ 16,113.00
		Annual Drive Savings:	$ 797.00	Annual Drive Savings:	$ 1,594.00
		Belt Drive Premium:	$ 51.80	Belt Drive Premium:	$ 727.26
		Payback / Months:	0.77 months	Payback / Months:	5.4 Months

Sales Approach—Belt Drives and Energy Efficiency

DRIVE No. 3

DRIVER: 100 HP / 1200 RPM Nema C Electric Motor
DRIVEN: 650 RPM Chiller Unit
CENTER DISTANCE: MIN: 80 Inches MAX: 82 Inches
Motor Efficiency: .93
Electric Rate: $0.075 / Kwh
Drive Operation: 7200 Hours per Year
Annual Kwh: 577,550 (Motor HP x .746 x Hours/Yr) / motor efficiency

WRAPPED V-BELT DRIVE

6 pcs. CP210 Super Blue Ribbon V-Belt
1 pc. 6CQ105 QD Sheave w/ F Bushing
1pc. 6CQ200 QD Sheave w/ F Bushing

Drive SF = 1.32

* Initial Drive Cost: $ 705.07

**Drive Sell Price: $ 1,736.68

GP $$$ $ 1,031.61

* FSP Distributor Pricing
** Ind. Consumer Pricing

+ Annual Drive Energy Cost: $ 43,310.00
+ Based on 90% belt efficiency

GOLD LABEL COG-BELT DRIVE

5 pcs. CX210 Gold Label Cog-Belt
1 pc. 6CQ105 QD Sheave w/ F Bushing
1pc. 6CQ200 QD Sheave w/ F Bushing

Drive SF = 1.52

* Initial Drive Cost: $ 756.61

**Drive Sell Price: $ 1,891.40

GP $$$ $ 1,134.79

* FSP Distributor Pricing
** Ind. Consumer Pricing

+ Annual Drive Energy Cost: $ 41,360.00
+ Based on 94.5% belt efficiency

Annual Drive Savings: $ 1,950.00
Belt Drive Premium: $ 154.72
Payback / Months: 0.95 months

RPP PANTHER DRIVE

1pc. 4956PTH14M-65 RPP Panther Belt
1 pc. 44PTH14-65 Sprocket w/ E Bushing
1 pc. 80PTH14-65 Sprocket w/ E Bushing

Drive SF = 2.28

* Initial Drive Cost: $ 950.56

**Drive Sell Price: $ 2,434.20

GP $$$ $ 1,483.64

* FSP Distributor Pricing
** Ind. Consumer Pricing

+ Annual Drive Energy Cost: $ 39,410.00
+ Based on 99% belt efficiency

Annual Drive Savings: $ 3,900.00
Belt Drive Premium: $ 697.52
Payback / Months: 2.1 months

Bibliography:

Information on drive systems, belts drives and efficiencies were assimilated from a number of sources including internal Carlisle Power Transmission data, Dept of Energy (DOE) and DOE Office of Industrial Technology.

Graphics and photo's have been compiled from numerous websites for reference purposes only as equipment examples. The intent is for education and general training to recognize types of equipment and in no way is intended to divulge any type of proprietary information.

Thanks to such companies as Trane, Lennox, Baltimore Air Coil, Shipley, Loren Cook for contributing to this knowledge base.