Brushless Electronically Controlled DC Motors

- Used in Commercial Refrigeration to replace 2 to 25 watt motors. (Estimated Price $180)
  - Small motors used for blowers (GE model 5443). GE claims a two year payback.
  - Larger blowers in A/C and heating systems available in 1/3 – 1 horse power. Used by Kroger in electronic retrofit program and they consume 33% energy.
- If all supermarkets purchased energy star labeled models
  - Estimated annual savings of $250 million
  - Equals eliminating emissions from 475 thousand cars.
- Source: Johnstone Supply Innov8 Magazine 2006.

Clean Energy Financing for Schools and Local Government

Three simple steps to get started:

- Contact a contractor to audit your facilities for energy upgrades and renewable energy systems.
- Define project improvements and work with your contractor to develop estimates for the cost, incentives and savings.
- Fill out the New Jersey Clean Energy Program Rebate applications and the Preliminary Project Financing Application.

All Program requirements and applications are available through the New Jersey Clean Energy Program website. To participate in this program or to find out more information about renewable energy and energy efficiency in New Jersey, please visit the website at **www.NJCleanEnergy.com**.

How to Conduct an Energy Audit: A Short Guide for Local Governments and Communities

www.state.nj.us/dep/dsr/bscit/SustCommunities.htm

Sample Cost Savings Analysis

Comprehensive energy efficiency upgrade (includes lighting, heating, air conditioning, and ventilation)	$500,000
Installation of a 200 kW solar energy system	$1,200,000
Total Project Costs	$1,700,000
New Jersey Clean Energy Program Grant	$890,000
Total Financing - 15 year term at 4.8%	$810,000
Total finance payment	$6,321 per month
Energy savings (from efficiency upgrades and solar system installation)	$8,917 per month
Monthly Cost savings (Years 1-15)	$2,596 per month
Annual Cost Savings (Years 16-25)	$35,000 per year
Total Savings (over and above the cost of the equipment and financing charges.)	$817,280

Heat Pumps: Ground, geo-source, & water source

- Pipe is vertical 200 ft or horizontally with 2 250 ft trenches 5 ft below ground with water and anti-freeze mixture circulating through the condenser coil that cools the refrigerant. Typically cools the coils with air from outside in your air conditioner.
- Some have electronically controlled motors
- Using new refrigerant – 410 A instead of R-22. not ozone depleting but still a greenhouse gas.
- 2 speed compressor.
- Used to heat domestic hot water for free in the summer time
- Water cools the refrigerant at 55 degree ground temperature

Light Emitting Diodes (LEDs)

- LEDs light bulbs were developed in the 1960s
- Solid-state semi-conductor devices that convert electrical energy directly into light.
- “Cold" generation of light leads to high efficacy because most of the energy radiates within the visible spectrum.
- If every US household replaced just one standard 60 watt bulb with CC Vivid LED bulb we could save 24,184,400,000 watts based on 103 million households with an average use of 4 hours per day per house.

LEDs Advantages

- LEDs emit light of an intended color without the use of color filters
- Shape of the LED package focuses light without needing an external reflector to collect light and direct it in a useable manner
- LEDs are insensitive to vibration and shocks
- LEDs are built inside solid cases that protect them, making them hard to break and extremely durable
- LEDs have an extremely long life span of 10 years which is twice as long as the best fluorescent bulbs and twenty times longer than incandescent bulbs.
- LEDs fail by dimming over time, not the abrupt burn-out of incandescent bulbs.
- LEDs give off less heat than incandescent light bulbs
- LEDs light up very quickly
  - An illumination LED will achieve full brightness in approximately 0.01 seconds, 10 times faster than an incandescent light bulb (0.1 second), and many times faster than a compact fluorescent lamp Disadvantages of using LEDs

LED Disadvantages

- LEDs are currently more expensive than more conventional lighting technologies.
  - The additional expense partially stems from the relatively low lumen output and drive circuitry/power supplies needed. A good measure to compare lighting technologies is lumen/dollar.
- LED performance largely depends on the ambient temperature of the operating environment.
  - "Driving" an LED 'hard' in high ambient temperatures may result in overheating of the LED package, eventually to device failure.

Sacramento LED Traffic Signal Initiative

- LED traffic lights last as long as 100,000 hours.
  - Uses just 12 watts to operate, compared to the 150 watts used by an incandescent bulb, which has a lifespan of 8,000 hours.
- The Sacramento decade-long conversion is saving 1.4 megawatts and should climb to 2 megawatts when all intersections have been converted.
  - Since the city of Sacramento converted its first two intersections to LEDs in 1994, more than 1,000 of the 1,300 intersections in Sacramento County have made the switch.
  - In April 1995, Sacramento converted its first large intersection (Pocket and Greenhaven roads) and the 30-day electric bill dropped from $148 to $21.40.
  - The savings is much greater today -- $557,000 annually across the county.

LEDs Cont'd

- Websites
  - http://www.germainsledlights.com/bulbs.htm
  - http://en.wikipedia.org/wiki/Led
  - http://www.ccrane.com/lights/led-lights-bulbs/index.aspx
  - http://www.sollight.com/
  - http://www.huiyuanyuan.com/product/en/product_list.asp?type_id=10
  - http://www.sunbriteleds.com/distributors.asp
  - http://www.smud.org/education/led.html

Other LED Information

- Beyond Components
  - Address: 180 Gordon Drive, Suite 111,Exton, PA 19341
  - Phone: 610-524-9660,Fax: 610-524-0718
  - Website: http://www.beyondcomponents.com
- Newark InOne
  - Address: 501 Office Center Dr, Ste 410,Ft. Washington, PA 19034
  - Phone: 800-263-9275, Fax: 215-654-1460
  - Email: philadelphia@newarkinone.coom
  - Website: http://www.newark.com