SCHAEDLER YESCO
ENERGY EFFICIENT TECHNOLOGIES

Topics:

- Energy Usage and Types
- Energy Conservation Measures
- Implementation of Energy Retrofit Projects
- Incentives to Conserve Energy
- Electrical Energy Efficient Technologies
- Energy Reference Tools

energy
WE SELL
ENERGY STAR

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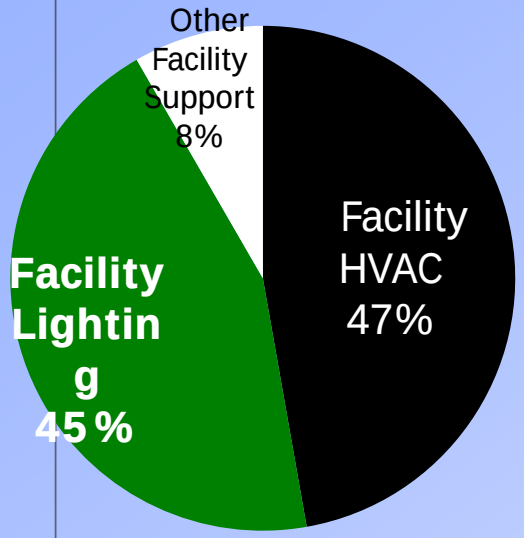
Energy Savings Solutions

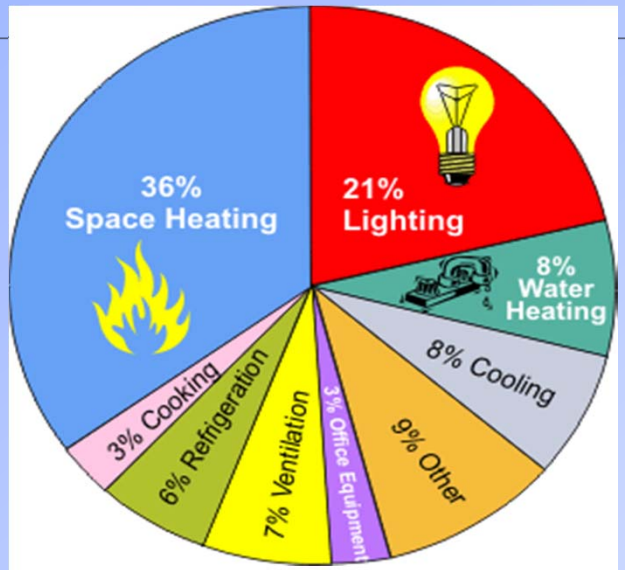
Energy Usage and Types of Energy Consumed
Industrial, Commercial and Residential Users

Industrial Users

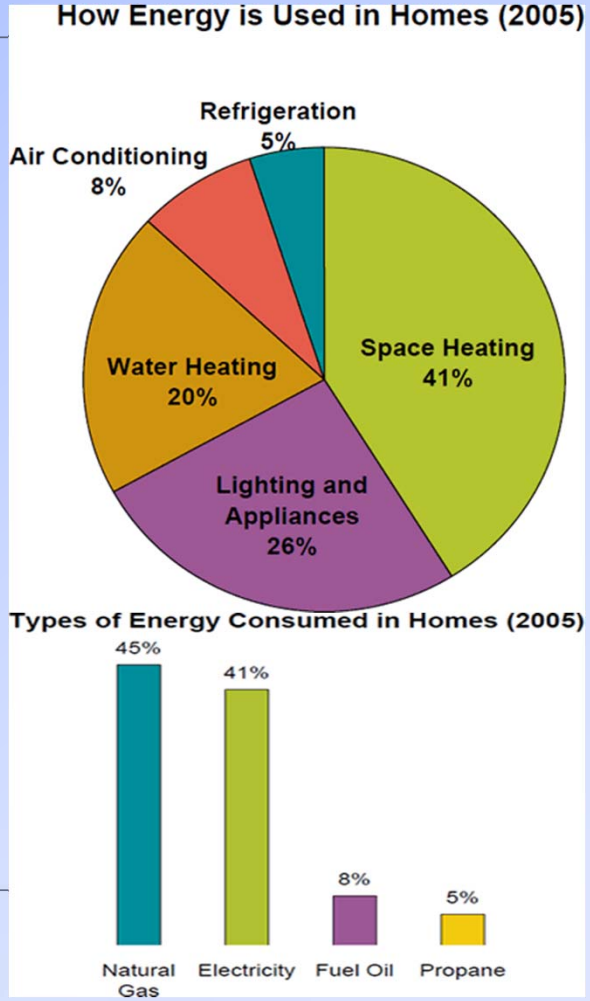
Industrial Electric Usage
Total Non-Process



Commercial Users



Residential Users



Sources: Energy Information Administration, 2003 Commercial Buildings Energy Consumption Survey and 2005 Residential Energy Consumption Survey.

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Energy Conservation Measures

Building Envelope

- Roof, Windows, Doors and Weatherization

HVAC Systems and Controls

- Air Handlers, Chillers, Boilers, Cooling Towers, Pumps and HVAC Control Strategies

Water Conservation

- Low Flow Plumbing Fixtures/Devices, Water Treatment and Control Devices

Utilities

- Demand Response
- Time of Use – Load Shedding Programs
- Fuel Switching Programs
- Site Cogeneration

Reduce Energy Consumption

Control kW Demand

Alternative Energy

- Solar, Wind, Hydro, Fuel Cell Technologies

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Schaedler Yesco Supported Energy Measures

Energy Procurement ← → **Energy Reduction**

Energy Procurement	Utility Bill Analyses

Energy Measurement	Power Distribution	Lighting Solutions	Automation	Alternative Energy
Sub Metering	Transformers	Lamp / Ballasts	Data Centers	Micro Turbines
Portables Meters	Harmonic Filters	New Fixtures	Wireless Controls	Solar
	Power Factor Correction (PFC)	Fixture Retrofit Kits	Timers	
	Uninterruptable Pwr Supplies (UPS)	Lighting Controls		
	Soft Motor Starters	Daylight Harvesting		
	Variable Freq Drives	Occupancy Sensors		
	Power Transmission	Dimming		
		Exit Signs		
		LED / Induction Technology		

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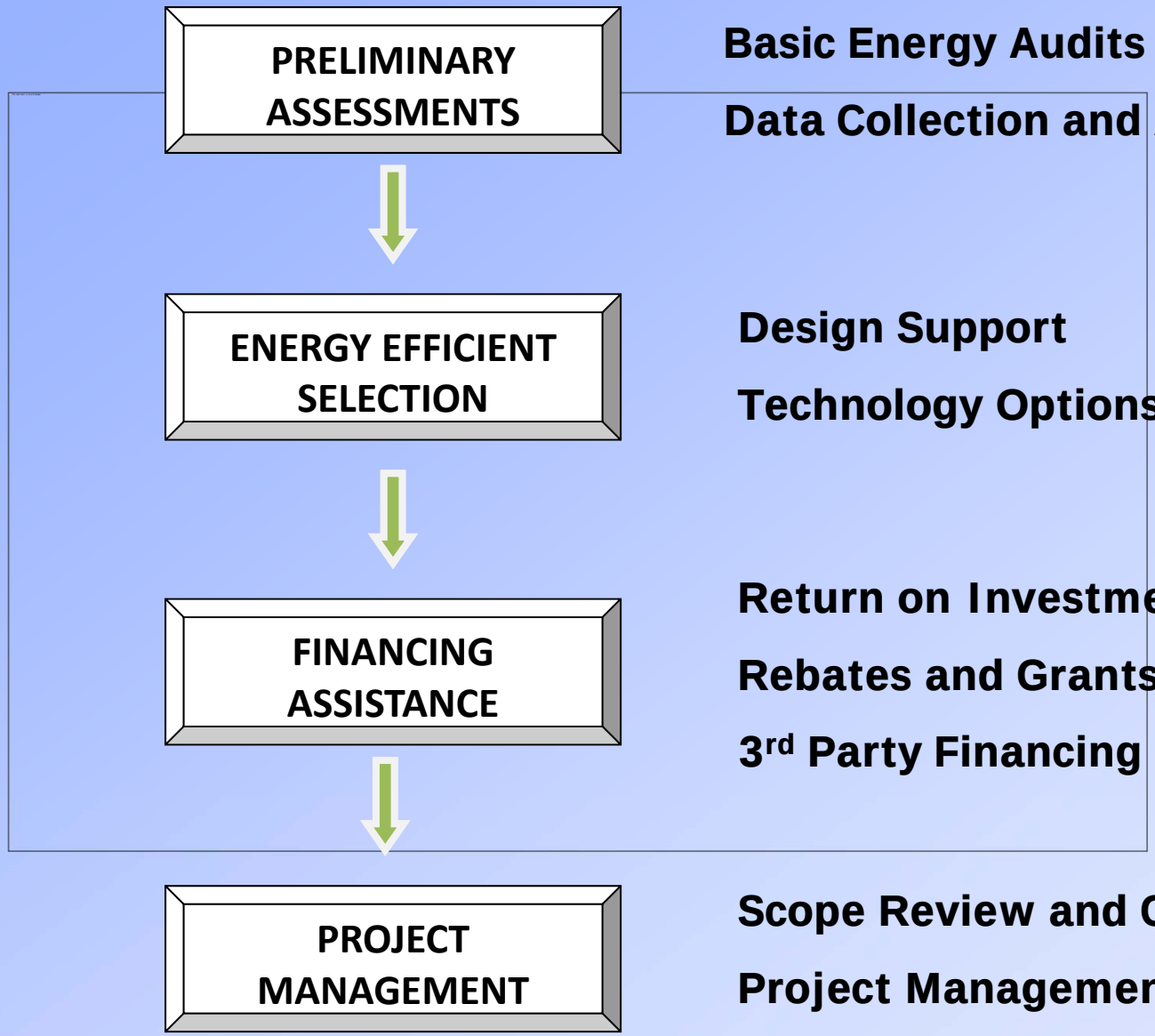
Implementation of Energy Retrofit Projects



Basic Energy Audits

Data Collection and Analyses

Design Support

Technology Options

Return on Investment Calculations

Rebates and Grants

3rd Party Financing Options

Scope Review and Coordination

Project Management

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INCENTIVES TO CONSERVE ENERGY

Facility or System Reasons:

- Lower Utility Bills
  - Consumption & Demand Control
- Upgrade of Old Systems
- Code Mandates
- Productivity Gains
  - Improve Employee Efficiency
  - Reduce Absentee
- Life Safety

Other Areas to Consider:

- Federal/State Rebates & Grants
- Capital Cost Avoidance
- Deferred Maintenance Costs
- Quality Building Environment
- Green Perception

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ENERGY TECHNOLOGIES

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Electrical Energy Efficient Technologies

Electrical Power Distribution ***Electrical Loads /End Devices***

Lighting Solutions







Power Efficiency & Metering





Motor Control



HVAC Fan / Pump Loads

Data Centers

Automation


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Measuring Energy Savings

"If you can't measure it, you can't save it"

- Energy Savings Data Collection
  - Baseline Measurements
  - Basic and Compressive Audits
  - Measurement and Verification
  - Pre and Post Measurements
- Portable Meters:
  - Lighting, Power, HVAC and Thermal Imaging
  - Audit Kits
- Fixed Meters, Sub Metering - Power and Energy

FLUKE

AMPROBE®

E-Mon® ™
Energy Monitoring Products

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Power Distribution Efficiency

Dry Type Distribution Transformers

- Efficiency Range from 97 – 99%
- Unloaded transformers have poor efficiency
- Reduced transformer heating and A/C loading

EATON

Controlling Harmonics

- Nonlinear loads are the source of harmonic currents
- Nonlinear loads include drives and any end device that utilizes a power supply
- Harmonics will produce power inefficiencies and additional heating in transformers

HARMONICS LIMITED
The GreenWay to Sustained Energy $avings

Power Factor Correction Capacitors

- Reduce electrical costs
- Reduce load losses of the distribution system
- Increase system's capacity
- Maintain a better voltage regulation

POWER SURVEY

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Optimizing HVAC Motor System Efficiency

4. HVAC Motor Loads

1. Incoming Power Source

High Efficiency Transformers

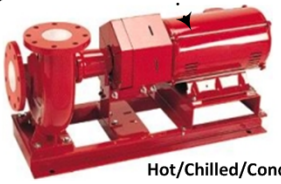
3. High Efficient AC Motors

Variable Frequency Drives

2. AC Motor Control

OR

Solid State Soft Starters



Hot/Chilled/Condenser Water Pumps

HVAC WATER SYSTEMS

Makeup Air Fans

Exhaut Fans

Inlet Vane Supply Fan

Air Handling Units

Cooling Tower Fans

HVAC AIR SYSTEMS

EATON

Trane

Jesco

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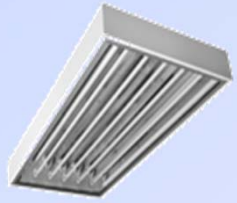
Energy-Efficient Lighting Upgrade Solutions

Why Upgrade:

- Lighting Electrical Usage (20-40%)
- Greatest Potential to Reduce Energy Consumption
- Obsolesces of Lighting System
- Upgrade Lighting System to Space Requirements

Lighting Upgrade Solutions:

- Lamps/Ballasts
- Fixtures & Retrofit Kits
- Lighting Control Strategies
- Lighting Designs



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Lamps/Ballasts Energy Choices

- Lamp Efficiency Choices: Incandescent, Fluorescent, HID, LEDs and Induction
- Wattage, Light Level and Lifespan
- Electronic Ballasts match to the Lamp Source
- Lamp Guide Available at the Sylvania Exhibit Table

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Lamp Replacement Guide

SYLVANIA

Lamp retrofits or replacements should remain within it's Category.		EXISTING LAMPS			NEW LAMPS				Energy cost savings: 10¢/KWh 10 Hr/day one year
Category	Typical Application	Existing Lamp Image	Wattage/ Lumens/ Life	Existing Ordering Code	New Lamp Image	New Lamp Ordering Code & Description	Wattage/ Lumens/ Life	About The Recommended Replacement	
1	Used in fixtures with shades, such as table lamps. May be used in decorative fixtures. May be used in surface or recessed down lights.		100/ 1710/ 750	A19 Incandescent		CF30EL/TWIST/827	30/ 2000/ 10,000	Compact Fluorescent. **Do not use on dimmed circuits.** 102% light output 27% energy input	$26.65
						CF20RC/A19/827	20/ 1200/ 15,000	Compact Fluorescent. **Do not use on dimmed circuits.** 64% light output 20% energy input	$29.20
						72A/HAL/F	72/ 1150/ 3500	Quartz Halogen. Use only on dimmed circuits. 68% light output 75% energy input	$10.22

Energy-Efficient Lighting Fixtures

- Interior/Exterior Applications

- Fixture Considerations
  - Light Source: Efficiency, Light Levels and Lifespan
  - Aesthetics
  - Mounting and Terminations
  - Lighting Designs
  - Controls

- Retrofits Kits – Linear Fixtures
  - Utilize latest fluorescent lighting technology
  - Upgrade reflector, ballast and lamp while reusing existing housing

- Lighting Designs
  - Electronic lighting designs based on best solution
  - Energy technology selection
  - Development of Energy Savings Report

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Lighting Control Strategies

Time Clocks and Photocells

- Simple, reliable and cost-effective methods of controlling lighting systems

Occupancy Sensors

- Occupied/Unoccupied control of lighting circuits

Dimming Technologies

- Manual and automatic dimming of lighting systems

Daylight Harvesting

- Automatic adjustment of fixture light levels based on the available natural outdoor light

Automated Lighting Management System

- Provides a centralized computer control of a lighting system

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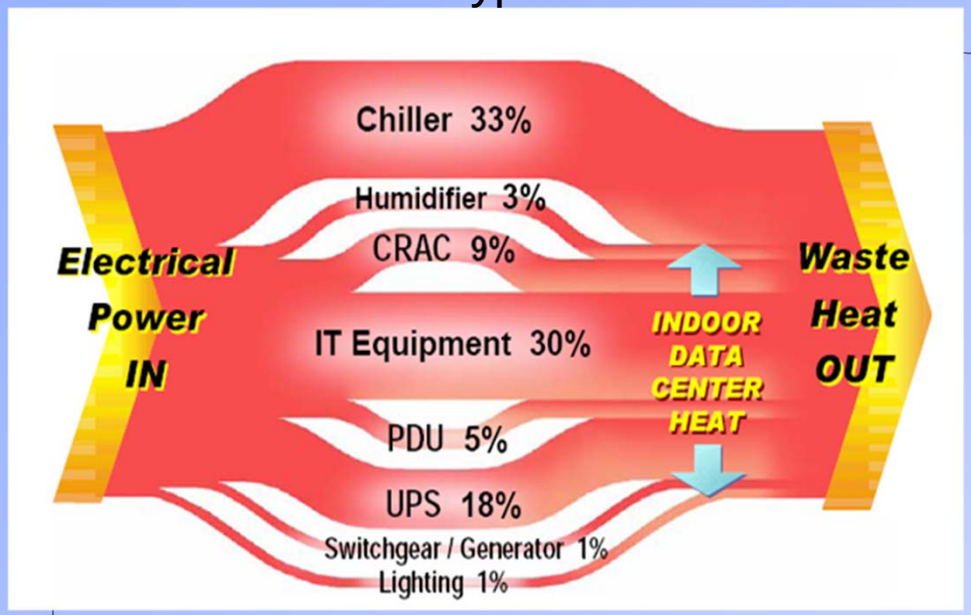
Implementing Energy Efficient Data Centers

Power Flow in a Typical Data Center



- Typical Data Center has eight power consumption areas
- Energy Design Criteria: Right sizing the infrastructure (HVAC & Power) to the IT load
- Reducing Electrical Power Consumption:
  - Right-size, modular , scalable power and HVAC equipment
  - Server Utilization
  - Higher efficient HVAC
  - Efficient floor layout
  - Efficient PDUs and UPS
  - Full management of the heat load

APC® Legendary Reliability®

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Automation - Energy Saving Devices

Programmable Thermostats

- Automatic Setback Control

Smart Power Strips

- Occupancy Sensor Controlled or Power Saver Mode

Programmable Timers

- Timed on/off Control for Individual Loads or Electrical Circuits
- Applications: Indoor and Outdoor, Appliances and Lighting

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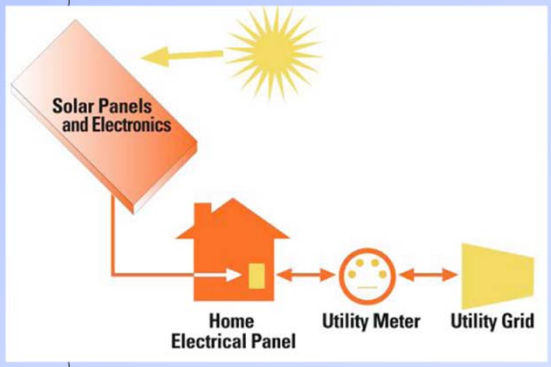
Alternative Energy

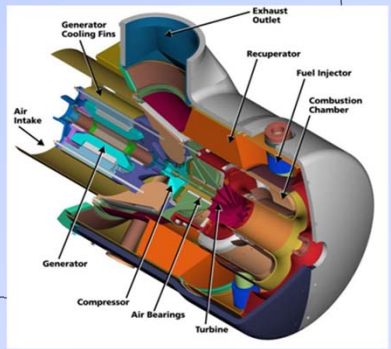
Solar - Photovoltaic

- Solar electric or photovoltaic (PV) systems produce electricity
- Grid-tied systems lower electric bills and produce positive environmental benefits.
- Solar in a Box includes solar modules,racking frame, micro-inverters, and grounding in one factory assembled unit



Micro Turbines

- 1 Fuel Source (Natural, Propane, Landfill, Digester, Sour Gases)
- 4 Possible Benefits Out
  1. Reliable Hot Water
  2. Reliability Chilled Water
  3. Reliable Electricity
  4. Reliable Back-Up Power
- Clean & Green
- Local Power Generation
- Power When You Need It Where You Need It



Future Energy Savings Measures

Clean Energy

Utility Demand Response and Time of Use Programs

Smart Grid

Renewable Energy

Energy Efficiency

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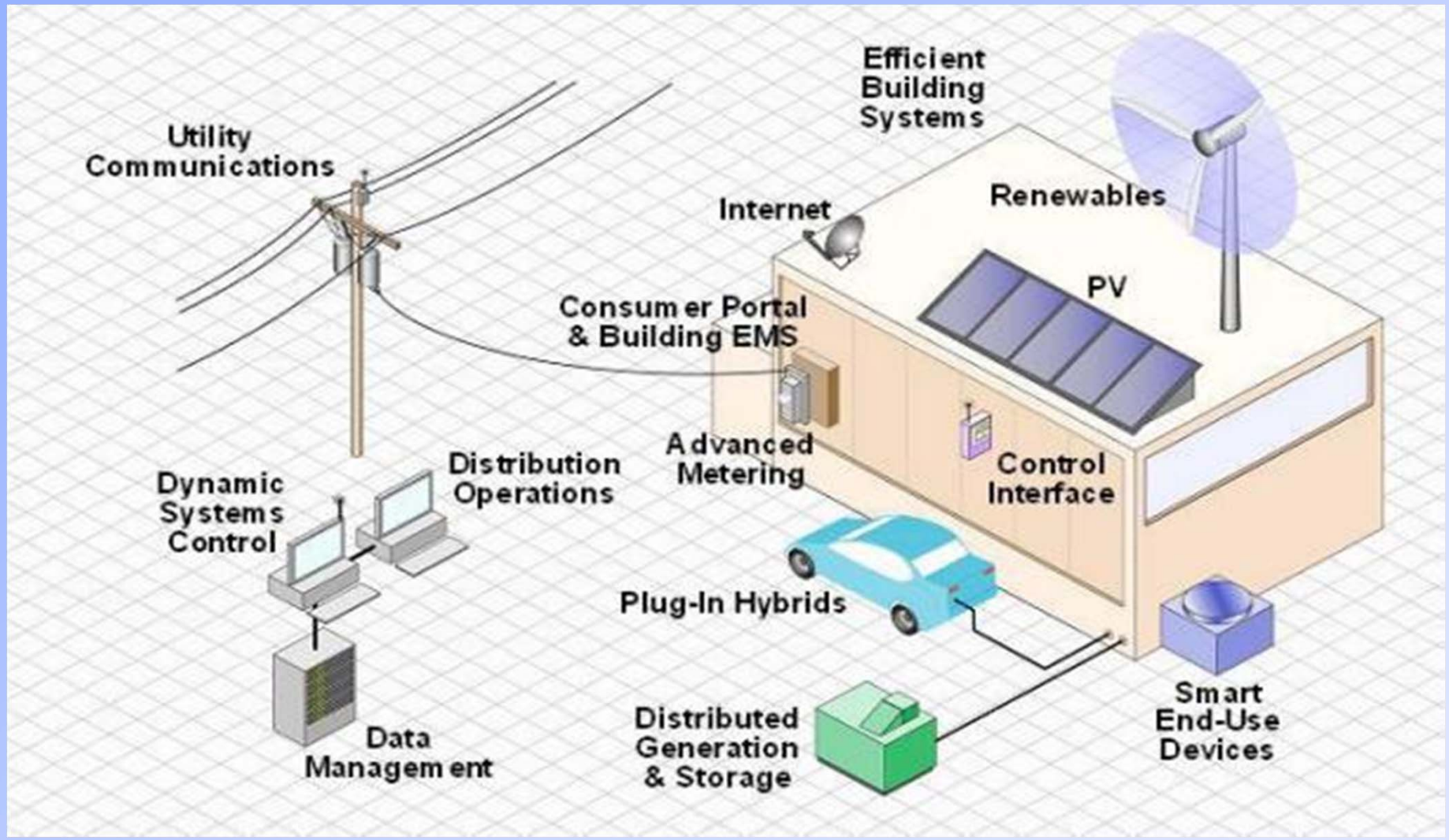
Smart Grid Application Diagram



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ENERGY REFERENCE TOOLS

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Electric Utility Rebates - Websites

SYD Energy Website: http://www.sydist.com/energy

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Energy Efficiency and Conservation Programs

Rebate Dollars Available thru Pennsylvania Electric Utility Companies

In the fall of 2008, Gov. Rendell signed new legislation intended to help residents and businesses save money by reducing electric consumption. ACT 129 requires all electric distribution companies (EDCs) with 100,000 or more customers to reduce energy consumption and demand in Pennsylvania. To accomplish these goals, the EDCs in the state are offering specific conservation and demand response measures for each of their residential, commercial and industrial users.

In response to this mandate electric utilities are currently offering rebates to offset the higher purchase cost of energy-efficient equipment for your business. Electric Utilities are providing incentives and information to qualifying Commercial, Industrial and Residential users that are encouraged to install energy-efficient equipment around such as premium efficiency motors, lighting, occupancy sensors, HVAC and building envelop. These are the first of many programs that will be offered to help meet Pennsylvania's new ACT 129 mandates for energy efficiency and peak demand reduction.

For more rebate information, please see the below list of electrical distribution company websites:

PPL Electric Utilities

http://www.pplelectric.com/e-power/

First Energy – Met-Ed, Penelec, Penn Power

http://www.energysavepa-business.com/

Allegheny Power

Residential Users:
http://www.alleghenypower.com/EngConserv/PA/WattWatchers/ResEECPA.asp

Commercial and Industrial Users:
http://www.alleghenypower.com/EngConserv/PABus/BusEECPa.asp

PECO

http://www.pecosmartideas.com

Duquesne Light

http://www.duquesnelight.com/wattchoices/#RE

PPL Electric Utilities

http://www.pplelectric.com/e-power/

First Energy – Met-Ed, Penelec, Penn Power

http://www.energysavepa-business.com/

Allegheny Power

Residential Users:

http://www.alleghenypower.com/EngConserv/PA/WattWatchers/ResEECPA.asp

Commercial and Industrial Users:

http://www.alleghenypower.com/EngConserv/PABus/BusEECPa.asp

PECO

http://www.pecosmartideas.com

Duquesne Light

http://www.duquesnelight.com/wattchoices/#RE

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Energy Education – Useful Websites

Pennsylvania Grants

http://www.dep.state.pa.us/grantscenter/GrantAndLoanPrograms.asp

Pennsylvania Public Utility Commission – ACT 129

http://www.puc.state.pa.us/electric/Act_129_info.aspx

Pennsylvania Governor's Green Government Council

http://www.portal.state.pa.us/portal/server.pt/community/guaranteed_energy_savings_performance/

Energy Policy Act of 2005 (EPACT2005)

http://energytaxincentives.org/business/commercial_buildings.php

Energy Star

http://www.energystar.gov

US Green Building Council

http://www.usgbc.org/

US Department of Energy

http://www.energy.gov/

Energy Website Reference Document Available at the SYD ESS Exhibit Table

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Schaedler Yesco Energy Savings Solutions Website

- Technologies
- Audit Forms
- Online Facility Energy Assessment
- Energy Links
  - Grants, Rebates and Tax Incentives
  - Energy Reference Tools
- Energy Checklists
- http://www.sydist.com/Energy

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Energy Efficient Electrical Upgrades Checklist

Measuring Energy Savings

- Portable and Integrated Metering

Energy Efficiency and Power Distribution

- Premium Efficient AC Motors
- Motor Control
  - Variable Frequency Drives
  - Reduce Voltage Starters
- High Efficient Transformers

Lighting Solutions

- Light Sources
- Lighting Fixtures and Retrofit Kits
- Lighting Control Strategies

Automation & Communications

- Data Centers
- Energy Saving Devices

Available at the SYD- ESS Exhibit Table

THANK YOU

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Construction Solutions Manager

Tel # 717-233-1621 x2423

Email Address: jpolites@sydist.com

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Energy Savings Expo

Lighting and Lighting Controls

SYLVANIA

Universal Lighting Technologies

LITHONIA LIGHTING

Lumination

LSI Industries

LUTRON

WattStopper

Energy Savings Measurement

FLUKE

AMPROBE

E-Mon Energy Monitoring Products

Automation and Communications

APC Legendary Reliability

Energy Efficiency and Power Distribution

EATON

HARMONICS LIMITED The GreenWay to Sustained Energy Savings

POWER SURVEY

Alternative Energy

Capstone

ReadySolar

Event Times:

7:30 -8:30 AM

10:30 - 3 PM

WE SELL ENERGY STAR

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Afternoon Session - Presenters

[12:30pm - 3:30pm]

Time	Energy Saving Presentations	Presenter
12:30	Update on Lamps and Ballasts	Kevin McGahey, Schaedler Yesco
1:00	Energy Solutions - Power Distribution & Motor Control	Tim Hronek, Eaton
1:30	Exterior LED Solutions	Brian Daley, LSI
2:00	Indoor LED & Fluorescent Retrofit Products	Tim Stacek, Laface McGovern
2:30	How to Measure Energy Savings	John Loxterkamp, Fluke
3:00	Greening of a Data Center	Trevor Norton, APC

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