Optimizing the Design and Control of Chilled Water Plants
Spring 2013

These links are provided as information only and are not in any way to be considered a comprehensive listing or as an endorsement by PG&E. All links were current at time of list creation. An electronic version of this list is available at www.pge.com/energyclasses/

Related Online Resources:

Advanced Buildings
Advanced Buildings was developed by the New Buildings Institute. It is a collection of technical resources and training opportunities useful to the design and operation of high performance buildings. The Tools + Guidance section includes design guides for small and large HVAC systems.
http://www.advancedbuildings.net/

Advanced Manufacturing Office. Technical Publications by Energy Systems
The Department of Energy’s Advance Manufacturing Office provides software tools, tip sheets, sourcebooks, case studies, and technical publications related to the efficient operation and assessment of motor, pump, and fan systems.
http://www1.eere.energy.gov/manufacturing/tech_deployment/technical_publications.html

Advanced Variable Air Volume System Design Guide
This comprehensive design guide is Attachment 11 of the California Energy Commission’s PIER Final Report, Integrated Energy Systems: Productivity and Building Science. It can be downloaded for free.

Air-Conditioning Heating and Refrigeration Institute (AHRI)
ARI is a national trade association representing manufacturers of air-conditioning and commercial refrigeration equipment. It develops and publishes technical standards; supports and assists training; and certifies performance ratings of products. Many of its guidelines and standards for systems and equipment are available for download.
http://www.ahrinet.org/

American Society of Heating Refrigerating and Air-Conditioning Engineers (ASHRAE)
ASHRAE is a professional organization dedicated to the creation and promotion of quality-based standard practices in the HVAC&R industry. Members have access to ASHRAE technical articles and conference papers. Anyone can browse abstracts of ASHRAE’s numerous books, journal articles and other technical publications that are available for purchase.
http://www.ashrae.org

California Energy Commission. Title 24 Energy Efficiency Standards
The CEC’s web site provides access to the Title 24 Energy Efficiency Standards, the Residential and Nonresidential Manuals, Compliance Forms, Certificates of Acceptance, other related documents, duct tape rulemaking, and information about energy analysis software programs.
http://www.energy.ca.gov/title24/
CALGreen
The latest edition of the *California Green Building Standards* can be downloaded from this page. New Guides to the CALGreen Code and other related publications are also available.
http://www.bsc.ca.gov/Home/CALGreen.aspx

Consortium for Energy Efficiency (CEE)
CEE is a consortium of energy efficiency program managers. It promotes the manufacture and acquisition of energy efficient products and services for homes and businesses. Topics include lighting, HVAC, and food service equipment. Efficiency specifications, product information, and qualifying equipment lists are available on this site.
http://www.cee1.org

CoolTools™ Chilled Water Plants Design Guide
This design guide from the CoolTools chilled water plants project can be downloaded from the publications section of the Taylor Engineering site. Several other related design guides are also available here.
http://www.taylor-engineering.com/publications/design_guides.shtml

Cooling Technology Institute (CTI)
CTI promotes the use of environmentally responsible evaporative heat transfer systems. A bibliography of technical papers, codes, standards and other publications are available on this site. Several full text articles are also available for download, as well as, an overview of the CTI Toolkit software, news, and certification information.
http://www.cti.org

CtrlSpecBuilder
This is a free online tool that assists with the specification writing process for HVAC control systems. The format is based on ASHRAE Guideline 13-2000.
https://www.ctrlspecbuilder.com/

DDC Online. Iowa Energy Center
The Iowa Energy Center provides unbiased information on Direct Digital Controls. This site includes a guide to controls manufacturers and their products, an Introduction to Digital Control Systems, an Input/Output tutorial that also covers analog devices, and advanced technical information on DDC Systems.
http://www.ddc-online.org

Energy Design Resources. HVAC Design
EDR provides access to many useful tools and resources related to the design and operation of energy efficient buildings. The HVAC Design category includes design briefs, guidelines, and design software tools that cover a variety of efficient HVAC design techniques and technologies. Titles include *Design Guidelines for Chilled Water Plants* and *Chiller Plant Efficiency*.

Functional Testing and Design Guides
http://www.peci.org/ftguide/

LEED® Green Building Rating System
Details about *LEED for New Construction and Major Renovations* rating system are provided here. Also included here is information about opportunities for LEED training, webcasts, and LEED credentials. The *LEED Reference Guides* can be downloaded or ordered in hard copy from this USGBC site. Project Profiles and Case Studies are located under the Resources navigation tab.
http://new.usgbc.org/leed/rating-systems
National Building Controls Information Program (NBCIP)
NBCIP was established by the Iowa Energy Center and provides unbiased information on building control system products and strategies, including reports that describe the actual performance of products tested by the program. All publications on the site can be downloaded free of charge.

Pumping System Assessment Tool
This free software tool form the DOE’s Industrial Technologies Program helps users assess the efficiency of pumping systems operations. A fact sheet and User Manual is included.
http://www1.eere.energy.gov/industry/bestpractices/software_psat.html

Pumps Systems Matter™
This pump system site contains a variety of useful tools for optimizing pumping systems and achieving better energy efficiency. Among the available resources are energy saving presentations, an assessment guide, case studies, white papers, and modeling tools.
http://www.pumpsystemsmatter.org/default.aspx

Taylor Engineering: Publications
Articles and presentations on mechanical systems by the staff of Taylor Engineering are available in the Publications section of their site.

Tool Lending Library at the Pacific Energy Center
The Tool Lending Library (TLL) site contains images and descriptions for each of its data collecting devices from over 100 vendors. Application Notes describe measurement techniques and provide step-by-step instructions for using specific tools. The TLL has a search feature to help you select the right tools for your project. A Tool Request Form and contact information are also provided.
http://www.pge.com/pec/tll/

Whole Building Design Guide. High-Performance HVAC
This recently updated section of the WBDG presents a comprehensive overview of high performance HVAC equipment and systems. It also describes practices for reducing HVAC energy use, emissions, and costs.
http://www.wbdg.org/resources/hvac.php?r=minimize_consumption

Commissioning

Building Commissioning Association (BCA)
The Building Commissioning Association is a professional organization dedicated to “promoting building commissioning practices that maintain high professional standards”. Best practices, information about commissioning-related events, and membership information are provided here.
http://www.bcxa.org/

California Commissioning Collaborative
The California Commissioning Collaborative is a group of government, utility, and building service professionals organized to develop and promote good commissioning practices in California. The CCC site includes over 40 case studies, plus a Library of articles, white papers, guides, and sample commissioning documents under its Resources category.
http://www.cacx.org

PG&E Resources:

Business Tools
PG&E Business Tools include Energy Usage, Billing History and Rate Comparison Tools.
http://www.pge.com/mybusiness/myaccount/analysis/
Demand Response Incentives
Information on the various Demand Response incentives offered by PG&E can be found here.
http://www.pge.com/mybusiness/energysavingsrebates/demandresponse/

Energy Use Audit Services. Energy Analyzer
Here are quick on-line tools for identifying and analyzing business energy use. Tools include an Online Energy Analyzer.
http://www.pge.com/mybusiness/energysavingsrebates/energyaudits/analyzer/

Money-Back Solutions for your Business by Industry
Here you will find information about cash rebates and incentives for replacing existing equipment with new energy efficient technologies or purchasing new equipment. Design assistance for a new facility and system process is also available.
http://www.pge.com/mybusiness/energysavingsrebates/incentivesbyindustry/

Money-Back Tool
Use the Money-Back Tool to instantly get a list of rebates that fit your needs—and see how much you could be saving each year.
http://www.pge.com/mybusiness/energysavingsrebates/moneybacksolutions/moneybacktool/index.html

PG&E PowerPathway™
PowerPathway offers a Portfolio of programs aimed at building capacity within the state of California to produce the skilled workers needed by PG&E and the energy and utility industry. The PowerPathway Portfolio includes four separate but interconnected efforts: Career preparation, Industry workforce challenges, Education, and Green communities.
http://www.pge.com/about/careers/powerpathway/

Partners and Trade Professionals
PG&E program partners, local contractors and trade professionals offer special assistance in implementing energy efficiency measures for your business.
http://www.pge.com/mybusiness/energysavingsrebates/partnersandtradepros/

Self-Generation Incentive Program at Pacific Gas and Electric
Financial incentive information, description of eligible technologies, forms, resources, and program contact information can all be accessed here.
http://www.pge.com/mybusiness/energysavingsrebates/selfgenerationincentive/

Solar Energy
PG&E provides information on how a photovoltaic system works; steps to take before installing solar in your home or business; solar schools; and requirements and applications for the California Solar Initiative Program.
http://www.pge.com/solar/

Tariff Book
This site contains all current gas and electric rate schedules.
http://www.pge.com/tariffs/

Third Party Incentive Programs and Fact Sheets
PG&E has partnered with energy efficiency specialists in order to extend the reach and effectiveness of energy efficiency, demand response, renewable energy, and self-generation programs. A fact sheet describing all of the specialists and their energy efficiency programs can be downloaded here. Use the search function to find information about all of the programs that are related to your market segment.
http://www.pge.com/thirdparty/

Understanding Your Bill
Sample business class bills with explanations for each bill item.
Print Resources Available in the PEC’s Resource Center:

- ASHRAE Handbook on HVAC Applications. ASHRAE, 2011

Journals

- ASHRAE Journal
- Consulting-Specifying Engineer
- Engineered Systems Magazine
- HPAC Engineering Magazine

Other Print Resources: