

What is considered "extensive renovations"? is simply replacing a diesel generator considered extensive"?

The law does not explicitly define what constitutes 'extensive renovations.' However, the replacement of existing HVAC equipment such as chillers and boilers creates a great opportunity to consider adding CHP. Due to the significant capital investment required to replace HVAC equipment, the efficiency benefits of CHP versus traditional boiler/chiller configurations can be achieved for an incremental addition of capital to the project (i.e., the difference between capital budgeted for the conventional system compared to the cost of the CHP system). As a result, CHP becomes much more economically attractive at times of extensive renovation.

What capital number is used for the financial model?

Capital costs vary significantly depending on the size of the CHP system, technology employed, and the related intricacies associated with a specific configuration. The estimated range of capital costs for CHP is typically \$1500-\$2500 per kW. The U.S. DOE Gulf Coast Clean Energy Application Center starts at a nominal capital cost of \$2000 per kW, but modifies that cost based upon the requirements of individual projects.

Do you have any history regarding data centers? Could a data center qualify?

The reliability and security provided by CHP systems make them a perfect match for data centers. HB 1831 and HB 4409 specifically call out data centers as buildings that may be expected to serve a critical function during a natural disaster or other emergency situation. The recently constructed BP Rodeo & Helios Plaza in Houston, which comprises a data center and trading floor for the energy giant, was built with an on-site CHP plant to enhance the building's energy security. More information on the use of CHP in data centers can be found on the U.S. DOE Gulf Coast Clean Energy Application Center website at <http://www.gulfcoastcleanenergy.org/Markets/CommercialFacilities/DataCenters/tabid/1392/Default.aspx>

What is considered "minimal cost" [i.e., the cost of a feasibility study provided by the U.S. DOE Gulf Coast Clean Energy Application Center]?

The U.S. DOE Gulf Coast Clean Energy Application Center is a source for low-cost CHP feasibility studies. Typically, feasibility studies cost in the range of \$3,000-\$10,000. The specific fee for the study depends on the complexity of the required analysis and other details associated with the development. If an initial Screening Analysis determines that the building has no potential for CHP, the feasibility study can be provided at no cost.

Which service trades are required for this changeover?

Installation of CHP systems requires specific skills and capabilities. Fortunately, a number of well-qualified CHP system developers, engineering firms, and equipment suppliers are active in Texas. A design-build approach is often used to simplify the development process. During construction, CHP systems use service trades similar to those required for HVAC retrofits or building construction, including Mechanical-Electrical-Plumbing (MEP) and HVAC providers. For operations and maintenance (O&M) of the CHP plant, existing facility personnel can handle most of the daily operations, provided they receive

appropriate training. For major O&M, it is recommended that the facility have a service contract with the manufacturer of the equipment. This is similar to any service contract, which the facility may have for its chillers, boilers, and controls. A number of firms are interested in providing CHP systems on a Design-Build-Finance-Own-Operate-Maintain (DBFOOM) basis. By providing a turn-key development service and the sale of energy commodities from the project, these firms can simplify the development process and reduce risks perceived by building owners.

How is the law enforced?

The legislation does not require any state agency to monitor compliance with HB 1831 or HB 4408. The operator of a critical facility required to undertake a CHP feasibility study may want to retain proof that the study was completed.

What is an audit? Who conducts audits?

An audit involves a walk-through of a specific facility to determine the existing HVAC equipment and energy uses. The information obtained through an audit can address specific questions and issues that can impact CHP system design considerations and improve the accuracy of a CHP system feasibility study.

Is an audit a requirement in the future operation of the facility?

The law does not require that audits be conducted on those critical government facilities that meet HB 1831's and HB 4409's CHP feasibility criteria.

What tools are available for CHP financial modeling?

A number of financial tools are available to model CHP systems including publically available models and proprietary models developed by service providers. The U.S. DOE Gulf Coast Clean Energy Application Center has access to a number of public and private models. These models range from simple spreadsheet models to extremely complex models. The U.S. DOE Gulf Coast Clean Energy Application Center will post some of these models on its website shortly.

How was the 30% savings number calculated?

Because the U.S. DOE Gulf Coast Clean Energy Application Center uses annual utility cost averages and rules of thumb for development, equipment, and construction costs, the accuracy of their feasibility study is estimated to be about +/-30%. The numbers can be further refined through a more rigorous "site-specific" approach including obtaining equipment and service quotations, thereby improving the accuracy of the feasibility analysis.

Is the savings estimate an annual number or over the 20 year span of the project?

The legislation states that the entity may equip a critical facility with a combined heating and power system if the expected energy savings exceed the expected costs of purchasing, operating, and maintaining the system over a 20-year period. The feasibility study should evaluate and clearly establish that a minimum simple payback for the CHP system is less than the 20-year criterion established by the legislation.

Is there a list of qualified CHP providers?

The U.S. DOE Gulf Coast Clean Energy Application Center does not maintain a list of qualified CHP providers, but it is a resource to assist in locating information about engineering firms and equipment suppliers active in Texas. The Texas CHP Initiative (www.texaschpi.org), a CHP industry association, is another source of information regarding service providers in the state.

Is the demo[lition] of existing equipment included in the 20-year payback?

Yes. Feasibility studies should compare conventional separate heat and power solutions to the CHP option. The analysis should include all project costs and all costs avoided by the CHP project. The U.S. DOE Gulf Coast Clean Energy Application Center considers a comprehensive list of costs in its feasibility studies including capital costs, operations and maintenance costs, utility escalation costs, avoided costs, depreciation, tax credits, pertinent state and federal incentives, and demolition costs.

Are there any changes to the interconnect policy in Texas to help CHP installations?

The interconnection policies established by the Public Utility Commission of Texas (PUCT) in 2001 provide an accelerated interconnection process for projects under 10 MW. The PUCT's accelerated process stipulates specific schedule and cost requirements that facilitate implementation of CHP projects. To aid adopters of CHP and other forms of distributed generation, the PUCT wrote a manual in 2002 describing the process in Texas. The manual, including links to the interconnection statutes, can be found at <http://www.puc.state.tx.us/electric/business/dg/dgmanual.pdf>.

Has anyone provided CHP as a self performance contract?

The U.S. DOE Gulf Coast Clean Energy Application Center is not aware of any current self performance contracts that involve CHP. For more information on self-performance contracts, visit http://www.energyservicescoalition.org/espc/tools/practice09/Self-funded_Program_Overview.pdf.