

# Audits & Retro-Commissioning

## Maximizing Building Energy Performance with Audits & Retro-Commissioning

Few measures are more important to the building energy improvement process than energy audits and retro-commissioning. Like routine service on an automobile, these measures can identify building energy performance issues, assess opportunities to improve performance, and fine-tune systems to ensure maximum energy efficiency. Audit and retro-commissioning work is typically performed by professionals with specialized skill sets, and professional certifications are offered by a growing number of both local and national organizations.

### Background

Energy audits and retro-commissioning activities help operators and building owners identify and improve a building's energy performance. Although sometimes performed together, they are distinct measures with unique benefits.

An energy audit is a comprehensive assessment of building energy consumption, including systems, insulation, operational characteristics and other elements.<sup>1</sup> Energy audits help building owners and operators understand energy costs, produce recommendations for energy performance improvements within the building as well as estimates of capital costs and energy/cost savings when measures are implemented.

Retro-commissioning is an energy performance assessment for existing buildings that ensures systems are functioning as originally designed. The process is essential for optimizing energy performance. Retro-commissioning typically focuses on energy-using equipment such as mechanical equipment, lighting and related controls and usually optimizes existing system performance, rather than relying on major equipment replacement, typically resulting in improved indoor air quality, comfort, controls, energy and resource efficiency.<sup>2</sup> The systems are then fine-tuned during the retro-commissioning process if defects or original design variances are found.



*Commercial HVAC systems are fine-tuned during retro-commissioning and assessed for energy improvement opportunities during an audit.*

### Benefits

**Identifying Improvement Opportunities.** Most building operators or owners have never conducted an energy audit. Many are unaware of existing energy and cost savings opportunities. Conducted by licensed professionals, audits provide operators with a thorough assessment of all energy-related aspects of a building and its operation. The resulting audit report empowers owners and operators with the information they need to make financial decisions about investing in energy conservation measures and performance upgrades.

**Fine-tuning Building Systems.** The performance of building mechanical and lighting systems typically degrades over time as the systems become older and as operators make hundreds or thousands of operational adjustments over the building's life cycle. Retro-commissioning assesses the performance of building systems and returns their performance to optimal settings for energy efficiency, safety, reliability, and comfort. By fine-tuning building systems, the life of the equipment can be extended. Commissioning analyses conducted by the

Lawrence Berkeley National Laboratory (LBNL) indicate retro-commissioning measures typically pay back over a period of 6 months to 2.5 years. The LBNL analyses called commissioning activities “the single-most cost-effective strategy for reducing energy, costs, and greenhouse gas emissions in buildings today.”<sup>3</sup>

**Creating Jobs.** An emerging field of employment for the next generation of building systems professionals, energy audits and retro-commissioning work directly creates jobs for credentialed energy auditors and retro-commissioning agents. Local jurisdictions should prioritize workforce development initiatives in conjunction with any energy audit or retro-commissioning policies.

## Getting Started

Energy audit and retro-commissioning policies should be developed with input from local energy auditors, commissioning agents and building operators. Jurisdictions should create workforce development initiatives, as well as create or leverage existing incentives to offset the cost of these measures to building owners.

### Step 1: Identify existing incentives.

Many utilities offer subsidized energy audits and retro-commissioning. Jurisdictions should, to the extent possible, create a policy framework that leverages existing incentives for building owners to conduct these measures.

### Step 2: Support workforce capacity.

Energy audits and retro-commissioning should be conducted by licensed or credentialed professionals to ensure quality craftsmanship. Jurisdictions should assess current workforce capacity and provide workforce training programs to supplement the existing market.

### Step 3: Assess the policy framework.

Energy audit and retro-commissioning policies should be structured in a cost-effective manner for building owners. Audits and retro-commissioning do not need to be conducted each year, and the audit and retro-commissioning requirements may differ for buildings of different sizes, ages, and complexity. Jurisdictions should work with local stakeholders to construct a reasonable policy framework that achieves the policy goals in a cost-effective manner.

## Existing Policies or Programs

### New York City, NY: Local Law 87 (Greener, Greater Buildings Plan)

<http://www.nyc.gov/html/planyc2030/html/about/ggbbp.shtml>

- **Adopted:** 2009 / **Effective:** 2013
- **Affected Property Types:** Commercial and multifamily buildings 50,000 SF and greater
- **Key Requirements:**
  - Buildings must have an energy audit and retro-commissioning conducted by a licensed professional once every 10 years. The initial implementation timeframe is 2013-2022.
  - Audit and retro-commissioning results must be reported to New York City.
  - Buildings that achieve LEED for Existing Buildings certification or the ENERGY STAR label in two of three years prior to the reporting deadline are exempted from audit and retro-commissioning requirements.



## San Francisco, CA: Existing Commercial Buildings Energy Performance Ordinance

[http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/committees/materials/LU012411\\_101105.pdf](http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/committees/materials/LU012411_101105.pdf)

- **Adopted:** 2011 / **Effective:** 2011-2013
- **Affected Property Types:** Commercial and municipal buildings 10,000 SF and greater
- **Key Requirements:**
  - Buildings greater than 50,000 SF must receive an ASHRAE Level II audit; buildings 10,000 SF to 49,999 SF must receive an ASHRAE Level I audit. Audit results must be reported to San Francisco.
  - Audits must be conducted every three years.
  - Buildings that achieve LEED for Existing Buildings certification or the ENERGY STAR label in two of three years prior to the reporting deadline are exempted from audit and retro-commissioning requirements.



## Providence, RI: Retro-Commissioning Energy Efficiency Grants

[http://www.providenceplanning.org/index.php?option=com\\_content&view=article&id=144&Itemid=144](http://www.providenceplanning.org/index.php?option=com_content&view=article&id=144&Itemid=144)

- **Overview:** Pilot program designed to help reduce carbon emissions, save energy, and create jobs. The City of Providence will award 7-10 grants to support retro-commissioning projects at an estimated average of \$20,000 per building, to help fund comprehensive retro-commissioning, including the technical assessment, on-site adjustments, HVAC and controls systems integration, and retro-commissioning documentation.
- **Affected Property Types:** Commercial, Institutional, and Industrial
- **Key Requirements:**
  - Applicants must be a taxpaying for-profit company OR nonprofit primarily providing services to the needy or the art, AND located within the City of Providence.
  - This pilot favors applicants with demonstrated need and limited access to resources, institutions that serve low-income or otherwise distressed populations, use fuel oil, and demonstrate savings for business viability or job growth or retention.
  - Buildings must contract to hire pre-qualified retro-commissioning consultants, who are technical assistants with expertise in building science.



## Complementary Policies

### Complementary Policy Landscape for Audits & Retro-Commissioning



## *Complementary policies can make audit and retro-commissioning more effective.*

- **Workforce development** programs can provide the workforce required to handle increased demand for these services, especially if they are mandatory.
- **Financing** programs should be created or leveraged to supply building owners supplemental finance options to conduct these measures and/or implement recommended improvement strategies.
- **Benchmarking and disclosure** policies provide building owners with an energy efficiency road map while holding them accountable for making changes to reduce consumption.

## References

1. There are different levels of audits based on assessment needs. For more, see Appendix, p. 5, at: [http://www.imt.org/files/FileUpload/files/Benchmark/sf\\_existing\\_commercial\\_buildings\\_task\\_force\\_report.pdf](http://www.imt.org/files/FileUpload/files/Benchmark/sf_existing_commercial_buildings_task_force_report.pdf)
2. Green California, Department of General Services: Commissioning and Retro-commissioning Buildings. <http://www.green.ca.gov/CommissioningGuidelines/default.htm>
3. Lawrence Berkeley National Laboratory. Building Commissioning: A Golden Opportunity for Reducing Energy Costs and Greenhouse Gas Emissions. 2009. <http://cx.lbl.gov/2009-assessment.html>

## Additional Resources

- Utility Incentive Programs. Jurisdictions may coordinate public policy with existing financial incentives to offset private sector costs. A number of utilities offer financial incentives for retro-commissioning measures, including:
  - Commonwealth Edison (ComEd) <https://www.comed.com/sites/BusinessSavings/Pages/retrocommissioning.aspx>
  - Pepco <https://cienergyefficiency.pepco.com/EnergySaveEB.aspx>
  - Pacific Gas & Electric Co. <http://www.pge.com/mybusiness/energysavingsrebates/rebatesincentives/retrocommissioning/>
  - Austin Energy <http://www.austinenergy.com/Energy%20Efficiency/Programs/Rebates/Commercial/Commercial%20Energy/buildingTuneup.htm>
  - National Grid [http://www.nationalgridus.com/niagaramohawk/business/energyeff/5\\_commission.asp](http://www.nationalgridus.com/niagaramohawk/business/energyeff/5_commission.asp)
- Building Commissioning Association. <https://netforum.avectra.com/eweb/StartPage.aspx?Site=BCA&WebCode=HomePage>
- San Francisco Ordinance: Environment Code-Existing Commercial Buildings Energy Performance. <http://www.sfbos.org/ftp/uploadedfiles/bdsupvrs/ordinances11/o0017-11.pdf>
- City and County of San Francisco. Mayor's Task Force on Existing Commercial Buildings: Final Report and Recommendations for the City and County of San Francisco. December 2009. [http://www.imt.org/files/FileUpload/files/Benchmark/sf\\_existing\\_commercial\\_buildings\\_task\\_force\\_report.pdf](http://www.imt.org/files/FileUpload/files/Benchmark/sf_existing_commercial_buildings_task_force_report.pdf)
- ASHRAE: Building Energy Assessment Professional Certification. <http://www.ashrae.org/certification/page/2704>