Labs21 Toolkit for High-Performance Laboratory Design

1 What is the Innovation?

The Laboratories for the 21st Century (Labs21) Toolkit is a set of tools to design laboratories that ensure occupant health and safety, lower operating costs through energy efficiency, and reduce overall environmental impact through the use of appropriate materials and technologies.

Tool	Purpose
Core information resources:	
Design Guide	Reference manual on energy efficiency features in laboratories.
Best Practice Guides	Information on design, construction and operation of specific technologies and strategies (e.g. energy recovery wheels in labs).
Case Studies	Case studies of high-performance laboratories
Energy Benchmarking	Compare a laboratory's energy use to other similar laboratories.
Design process tools:	
Design Process Manual	Process steps to design and construct high-performance laboratories.
Design Intent Tool	Consistent documentation of energy and environmental metrics
Environmental Performance Criteria	Rating of overall environmental performance in terms of energy use, water use, materials used, and occupant health and safety.

2 Origin and Use of the Innovation

The Labs21 Toolkit was developed by Lawrence Berkeley National Laboratory and the National Renewable Energy Laboratory, for the Labs21 Program – a voluntary partnership program sponsored by the U.S. Environmental Protection Agency and the U.S. Department of Energy. Over the last five years, the toolkit has been used on the design of new and retrofit laboratory projects by pharmaceutical companies (e.g. Pfizer, J&J), academic institutions (e.g. University of California, Duke) and federal agencies (e.g. Dept. of Agriculture, NOAA). Hundreds of copies have been downloaded or distributed to architects, engineers, and laboratory facilities managers.

3 Why is it Innovative?

Buildings in general account for about 40% of the nation's energy use, and the typical laboratory is about five times as energy intensive as an office building. However, designing laboratories to be energy efficient can be challenging, given their inherent complexity and health and safety requirements. Design tools developed for commercial buildings are not as effective for laboratories. The Labs21 toolkit is specifically geared to this important and energy-intensive building type. Some examples of its use:

- Stanford University used the energy benchmarking tool to compare the energy use of about 20 of their laboratories, in order to identify opportunities to improve energy efficiency.
- The University of Rochester used the toolkit in the design of a new biomedical engineering laboratory, and optimized its ventilation requirements to reduce future operating costs.
- The Design Guide has been used by laboratory planners and designers at firms such as HOK, CUH2A, Earl Walls Associates, and Newcomb&Boyd. Information from the Design Guide has been applied to at least 5 million sq.ft. of laboratories.
- The University of California (UC) has incorporated the Labs21 Environmental Performance Criteria into their construction policy, which will be used on about 14 million sq.ft of planned laboratory projects. Additionally, the toolkit has been incorporated into a one-day course for UC design and construction staff. This is being taught at 6 locations in 2004-2005, and when completed would have trained over 200 people on the topic of energy efficient laboratories.

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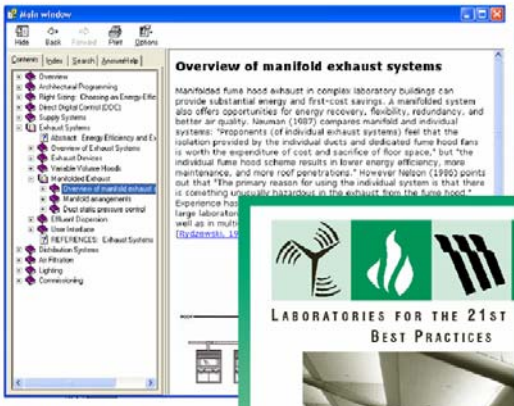
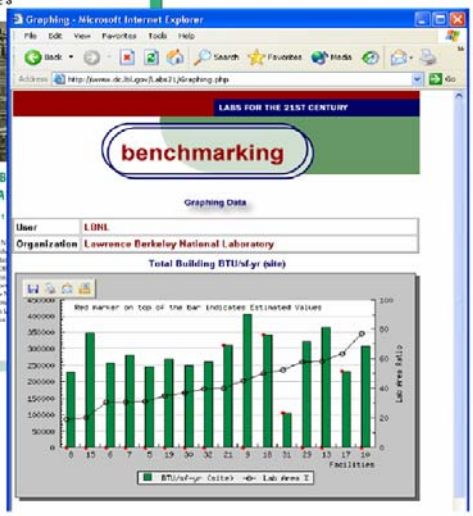
Core Information Resources



Design Guide

Best Practice Guides

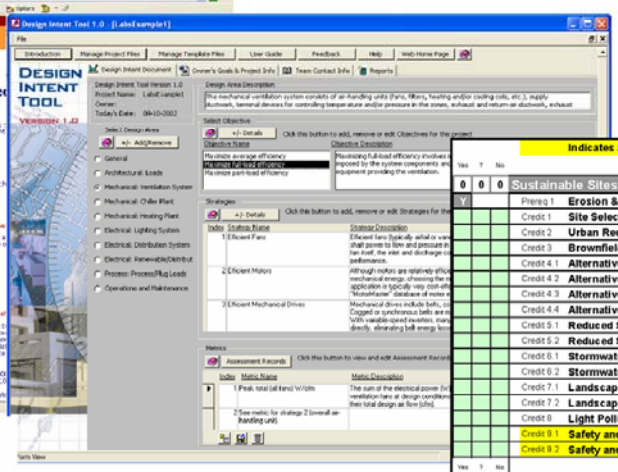
Case Studies



Energy Benchmarking

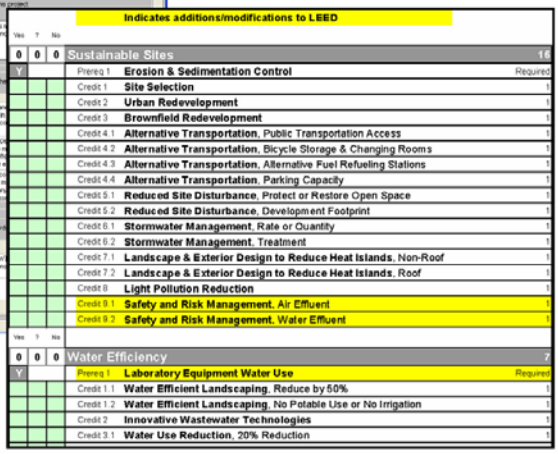
Design Process Tools

Design Process Manual



Design Intent Tool

www.labs21century.gov/toolkit



Environmental Performance Criteria