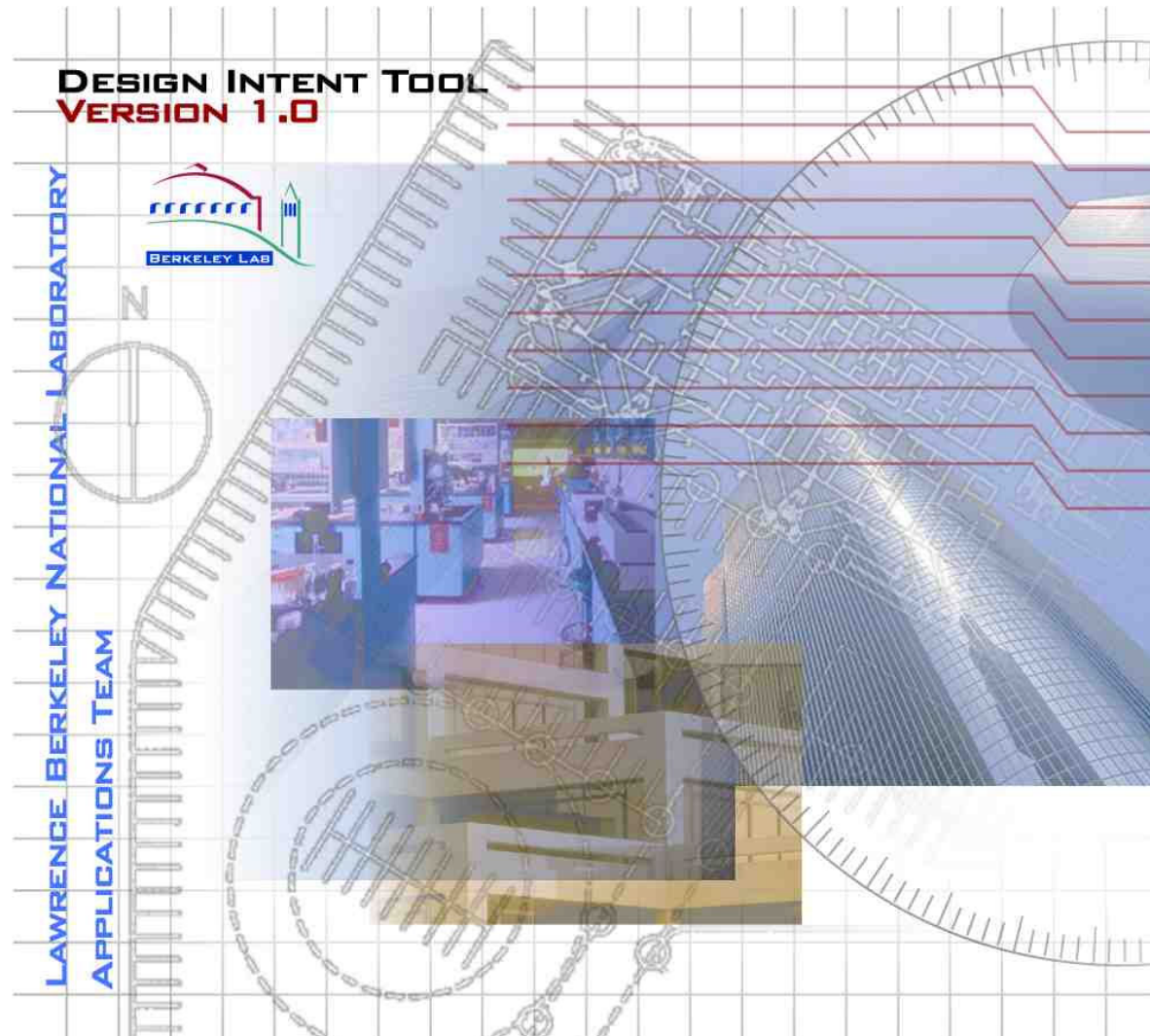


User Guide



This database tool provides a structured approach to recording design decisions that impact a facility's performance in areas such as energy efficiency. Using the tool, owners and designers alike can plan, monitor, and verify that a facility's design intent is being met during each stage of the design process. Additionally, the Tool gives commissioning agents, facility operators and future owners and renovators an understanding of how the building and its subsystems are intended to operate, and thus track and benchmark performance. On-line at <http://ateam.lbl.gov/DesignIntent/home.html>

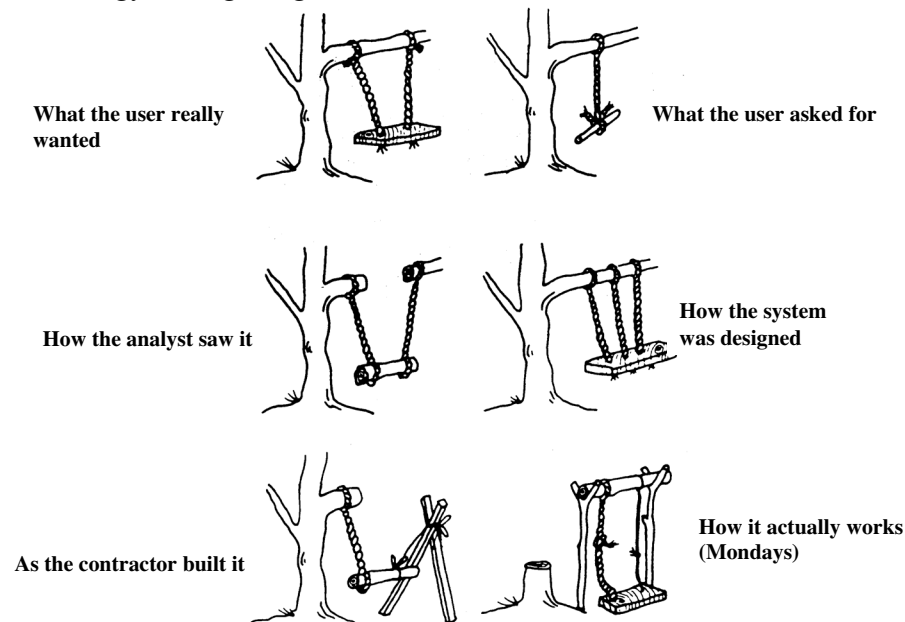
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Introduction

Welcome to the Design Intent Tool. The Tool helps building owners, architects, and engineers develop a Design Intent Document (DID) to facilitate recordkeeping and ensure that the owner's and designer's up-front vision and goals (with a focus on energy-efficiency, but applicable to any aspect of design) are achieved and periodically verified through performance measurement. The tool is available at no charge via <http://ateam.lbl.gov/DesignIntent/home.html>.

As the fields of facility design and management mature, there is an increasing understanding that it is necessary but not sufficient to simply specify “good” technologies or design features in order to achieve desired performance. Efforts to do so are often thwarted by the absence of explicit direction from the owner, misunderstandings and different visions among members of the design team, and ambiguities imposed by the lack of measurable performance targets. The lack of clarity created by these problems in turn hampers the post-construction commissioning and measurement & verification processes. A more comprehensive and holistic approach can be described as “Design Intent Documentation”. At the heart of the Design Intent Tool is a framework in which design solutions can be described in terms of Objectives (overall goals), with subordinate Strategies (specific means of achieving the goals), and Metrics (measurable performance targets). The result is an improved likelihood of attaining desired energy savings targets.



Documenting Design Intent

Design documents evolve as the project moves through the milestones of programming, design, and construction, into building occupancy and potential future renovations and retrofits.

Design intent documentation is crucial to the post-construction commissioning process (verifying the proper installation, operation, and performance of energy-efficiency features), and it is the essence of communication and contractual obligation between the building owner, architects, engineers, builders, and commissioning agents. And, when buildings change hands new owners can benefit tremendously from prior design intent documentation.

Developing a project's DID is a team effort. Many stakeholders need to be involved, including the building owner, occupants, design team members, facility operator(s), construction manager, and commissioning agents. Typically, one of the team members (e.g. the commissioning agent) takes the lead (on behalf of the owner) on seeing the DID process through to completion.

This Tool helps the user create a DID and a series of derivative reports (in MS-Word and MS-Excel format). Information entered by the user is gathered and organized using an MS-Access database. The Tool comes with importable default design suggestions (called Template Files), but users are encouraged to tailor it to their needs. The Template for energy management in laboratory-type facilities is supported by the Lawrence Berkeley National Laboratory *Design Guide for Energy-Efficient Laboratories* (<http://ateam.lbl.gov/Design-Guide/index.html>). Viewing links to the Design Guide requires a web browser (but not an active web connection). A Template for defining projects for conventional buildings according to the LEED “green buildings” criterion is also packaged with the Tool.

The Tool works in conjunction with a web site to provide links that efficiently bring the user to more in-depth design assistance resources, provides the most recent version for download, etc.

The Design Intent Tool was developed by the Applications Team at Lawrence Berkeley National Laboratory, with primary sponsorship from the California Energy Commission. The California Institute for Energy Efficiency sponsored initial conceptual development of the Tool. Portland Energy Conservation Inc. collaborated on an earlier version of the tool.

Benefits -- Why document design intent?

Buildings often fail to perform in practice as expected during design. In the case of energy-efficiency, actual savings often fall short of predictions. A building design process devoid of quantitative feedback does not detect or correct problems. One cause of this is the lack of a consistent method for documenting and communicating information about intended performance.

A facility's design intent is expressed as a set of qualitative Objectives that are developed into focused Strategies and then into quantitative Metrics. A Design Intent Document is intended to capture and preserve this information across the building's life-cycle, helping to ensure that:

- Participants in the project are able to clearly document their desired performance objectives during initial planning phases.
- Evaluations of proposed design options are better supported and the resulting decisions (including rejection of preliminary recommendations) are better documented and shared among design team members.
- Assessment of design changes during construction and operations and maintenance (O&M) is improved.
- The commissioning process is more comprehensive and cost-effective when supported by access to clearly specified performance targets.
- O&M evaluation of the day-to-day performance of systems and the early detection and diagnosis of maintenance problems are enhanced through performance benchmarking.
- Performance contracting and measurement and verification are supported in a structured and proactive manner.
- Post-occupancy evaluation is more easily performed.

Getting Started

1. Please note that the DIT file is over 11.6 Mb: If you are using a 56k modem, download times will exceed 12 minutes. If you prefer to receive a copy by mail, send email to MAJohnson@lbl.gov

2. Minimum Hardware/Software Requirements:

- Operating System: Windows 95, 98, ME, NT 4.0, Windows 2000, or XP
- Processor: Pentium II 200 Mhz; RAM: 64 MB
- Software: > MS Access 2000
 - > MS Word 2000 (allows viewing and printing of Text reports)
 - > MS Excel 2000 (allows viewing and printing of DataTracker report)
- Recommended screen resolution: 1024x768 or higher

Functionality will be enhanced if an active Internet connection is established while the Tool is in use.

3. Installation Instructions: Download the DIT (DITInstall.exe) to your MS Windows™ desktop. Double-click DITInstall.exe on your desktop and follow the prompts. Program icons will be created for launching the tool from the desktop or from the Program files directory.

4. Using the Tool:

- First, the owner selects a “Design Intent Coordinator” to orchestrate input to the Tool by all stakeholders. The Owner or Coordinator completes the "Owner's Goals & Project Info" and "Team Contact Info" Tabs, and, if desired, selects an appropriate Template File.* These steps provide the design team with a conceptual framework and guideposts.
- The design team then develops the project's Design Intent Document Tab by adding/deleting/modifying the Design Areas, Objectives, Strategies, and Metrics (including “+/- Details” and “Assessment Records” sub-pages).
- The Design Intent document is finalized, with input from all stakeholders. Reports generated in MS-Word and MS-Excel can be fed into the design program, specs, and other documents for easy modification.

* To save users' time, we have prepared optional default “Template Files” that users can begin with and modify as they see fit. These may be imported from the "Manage Project Files” button. The initial Release includes one Template File applicable to laboratory-type facilities (with links to the Laboratory Design Guide) and another for LEED's green-buildings measures (<http://www.usgbc.org/programs/leed.htm>) for common building types. Users can also develop their own templates.

Tour of The Tool

The following pages offer annotated screen shots of key parts of the Design Intent Tool.

Navigation Bar

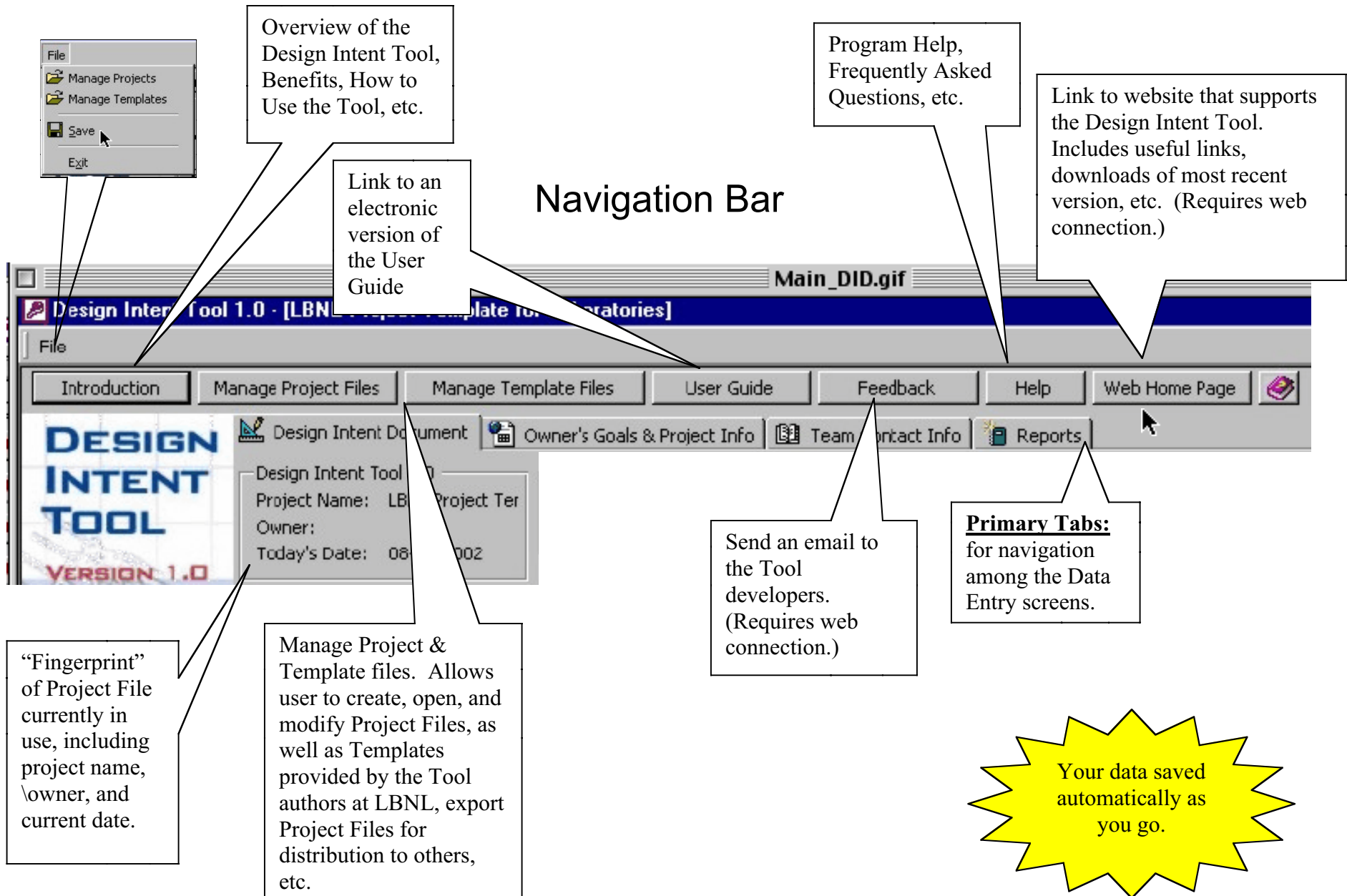
- [Introduction, Manage Project Files, Manage Template Files, User Guide, Feedback, Help, Web Home Page](#) – Helpful tools, background info, etc.

Primary Tabs

- [Design Intent Document Tab](#) – Most of the work is done here. This page allows the user to create/edit Design Areas, Objectives, Strategies, and Metrics.
- [Owner's Goals & Project Info Tab](#) – This tab contains a high-level description of the owner's goals, criterion for selecting the design team, and various project and building details.
- [Team Contact Info Tab](#) – This tab contains the names, addresses, email for project team members.
- [Reports Tab](#) – This tab allows users to generate six different reports, each composed of a set of information from the Design Intent Document and associated screens. The Data Tracker report (Excel format) can be imported into the *Mettracker* tool (http://buildings.lbl.gov/hpcbs/Year_01/Element_2/01_E2_P2_1_2.html) for more comprehensive analysis.

Detailed Screens

- [Detailed Design Areas, Objectives, and Strategies Records](#) – Pop-up screens providing greater detail.
- [Assessment Records](#) – Detailed information about metrics, and a template for recording and verifying measurements to ensure that the target values are attained and maintained.
- [Manage, Export, or Import Projects and Templates](#) – Managing “Project Files”.



DESIGN INTENT DOCUMENT:

Most of the data entry is done here. This page allows the user to create/modify Design Areas, Objectives, Strategies, and Metrics.

DESIGN AREAS: (see p. 11 for details)

Design Areas are the highest-level structure for organizing design intent information. Design Areas (and all other levels of information on the Design Intent Document) can be created, modified, or deleted. The remaining information displayed on this Tab depends on which Design Area is selected.

Program Help:

“Red Book” icons throughout the Tool will bring you to relevant sections of the User Guide.

Design Intent Document Tab

Navigation Bar (p. 6)

OBJECTIVES:

(see p. 12 for details)

Objectives are overall goals for the project, organized by Design Area.

STRATEGIES:

(see p. 13 for details)

Strategies are methods for achieving the Objectives, organized by Design Area.

METRICS:

(see p. 14 for details)

Metrics are quantitative measures of performance corresponding to the Objectives. The Assessment Records provide a framework for recording and tracking Target and actual performance. The data can be exported to an Excel file using the Reports Tab

Create/delete metric

Metrics can be created/deleted/saved via these icons

Content Help:

Links the user to background information about material provided in Template files, including web links (internet connection required).

Design Intent Tool 1.0 - [LBNL Project Template for Laboratories]

Manage Project Files | Manage Template Files | User Guide | Feedback | Help | Web Home Page

Design Intent Document | Owner's Goals & Project Info | Team Contact Info | Reports

Design Intent Tool 1.0
Project Name: LBNL Project Ter
Owner:
Today's Date: 08-20-2002

Select Design Area
+/- Add/Remove

- General
- Architectural: Loads
- Mechanical: Ventilation System
- Mechanical: Chiller Plant
- Mechanical: Heating Plant
- Electrical: Lighting System
- Electrical: Distribution System
- Electrical: Renewable/Distribut
- Process: Process/Plug Loads
- Operations and Maintenance

Design Area Description
This area includes whole-building information or information pertaining to multiple

Select Objective
+/- Details | Click this button to add, remove or edit Objectives for this project

Objective Name	Objective Description
Achieve high overall energy efficiency	Energy efficiency is low energy consumption to achieve high overall efficiency is low whole-building energy use per square foot of building.

Strategies
+/- Details | Click this button to add, remove or edit Strategies for the Objective

Index	Strategy Name	Strategy Description
1	Exceed Title 24 requirement by factor of 2.5 (energy use 40% of Title 24 budget)	Energy code requirements can typically be easily exceeded by a factor of 2.5. Title 24 is California Code. Buildings can comply with the Code either by meeting the requirements or by exceeding them.
2	Achieve LEED Platinum rating	The Leadership in Energy and Environmental Design (LEED) was created by the U.S. Green Building Council (USGBC) to provide a framework for recording and tracking Target and actual performance. The data can be exported to an Excel file using the Reports Tab
3	Minimize life-cycle cost	The life-cycle cost of a building is its total cost over its life span, including design, construction, and operation.

Metrics
Assessment Records | Click this button to view and edit Assessment Records for the Objective

Index	Metric Name	Metric Description	Target	Units
1	Total annual kWh/sf	Whole-building electric energy use per gross square foot of building. From building electric meter.		
2	Annual source BTU/sf (combined gas and electric)	Whole-building total energy use per gross square foot of building. From building gas and electric meters.		

OWNER'S GOALS & PROJECT INFO:

This tab is the critical starting point, where project Owners set the stage for the design and establish direction for the completion of the Design Intent Document.

A very brief, high-level description of the owner's goals for the project.

Owner's criteria for selecting the Design Team.

Building operating details, such as schedule, design conditions, and use.

Project details, such as name, address, project website address, and basic building characteristics.

Owner's Goals & Project Info Tab

Design Intent Tool 1.0 - [LBNL Project Template for Laboratories]

File Introduction Manage Project Files Manage Template Files User Guide Feedback Help Web Home Page

Owner's Goals & Project Info Team Contact Info Reports

Owner's Goals: High-level mission statement from the owner

The proposed facility should be designed to use 50% less energy than a baseline building built to appropriate code, e.g., Local or State Building Code, ASHRAE 90.1, 90.2, 10CFR435, etc., without sacrificing the habitability or the comfort and health of the occupants. A LEED rating of Gold should be attained.

Design Team Selection: Owner's criterion for evaluating and selecting the design team

General Qualifications:
The design team must have demonstrable expertise and experience with design strategies and techniques for incorporating energy efficiency and sustainable design practices that meet life-cycle economic criteria. This expertise can be demonstrated by previously documented projects and by partnering with recognized energy and sustainable design experts. The consideration for energy efficiency and environmental quality should begin at the earliest stages of planning where design intent is articulated, and follow through construction and operation. Also, there should be scheduled review of the energy and environmental strategies throughout the design process.

Specific Qualifications--The Team must be willing and able to evaluate & utilize:

Project Details

Project Name: LBNL Project Template for Laboratories

Street Address 1:

Street Address 2:

City: State: Zip:

Phase Design Intent Documentation was Started:

Project Home Page (URL):

Year Project Initiated: Floor Area:

Building Stories: Number of Buildings:

Predominant Occupancy Schedule:

Predominant Indoor Design Conditions:

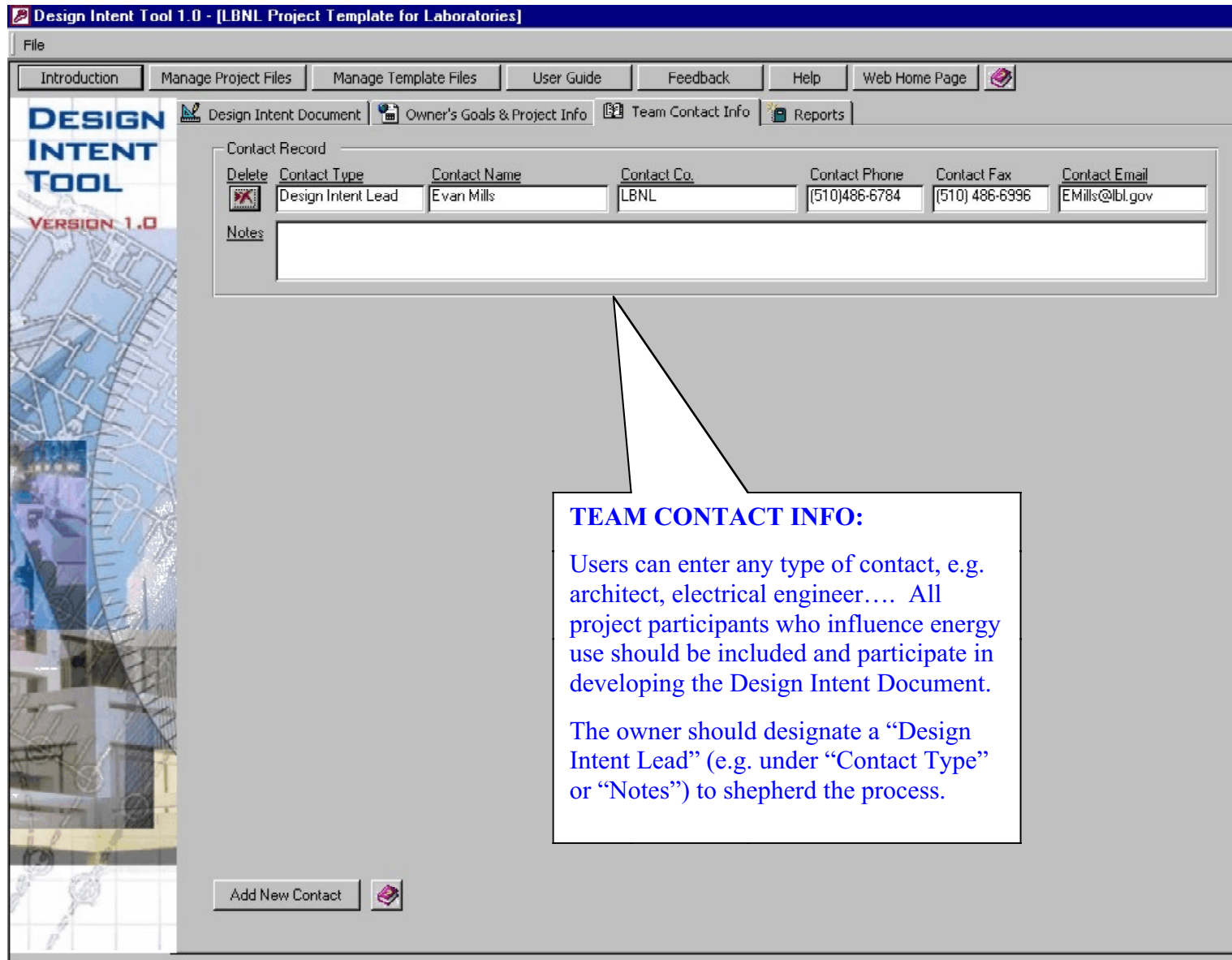
Building Use Type: Lab-Production

Lab Type:

Code Occupancy Group:

Percent of Floor Area in Labs:

Team Contact Info Tab



Design Intent Tool 1.0 - [LBNL Project Template for Laboratories]

File

Introduction Manage Project Files Manage Template Files User Guide Feedback Help Web Home Page

Design Intent Document Owner's Goals & Project Info **Team Contact Info** Reports

DESIGN INTENT TOOL
VERSION 1.0

Contact Record

Delete	Contact Type	Contact Name	Contact Co.	Contact Phone	Contact Fax	Contact Email
	Design Intent Lead	Evan Mills	LBNL	(510)486-6784	(510) 486-6996	EMills@lbl.gov

Notes

TEAM CONTACT INFO:

Users can enter any type of contact, e.g. architect, electrical engineer.... All project participants who influence energy use should be included and participate in developing the Design Intent Document.

The owner should designate a "Design Intent Lead" (e.g. under "Contact Type" or "Notes") to shepherd the process.

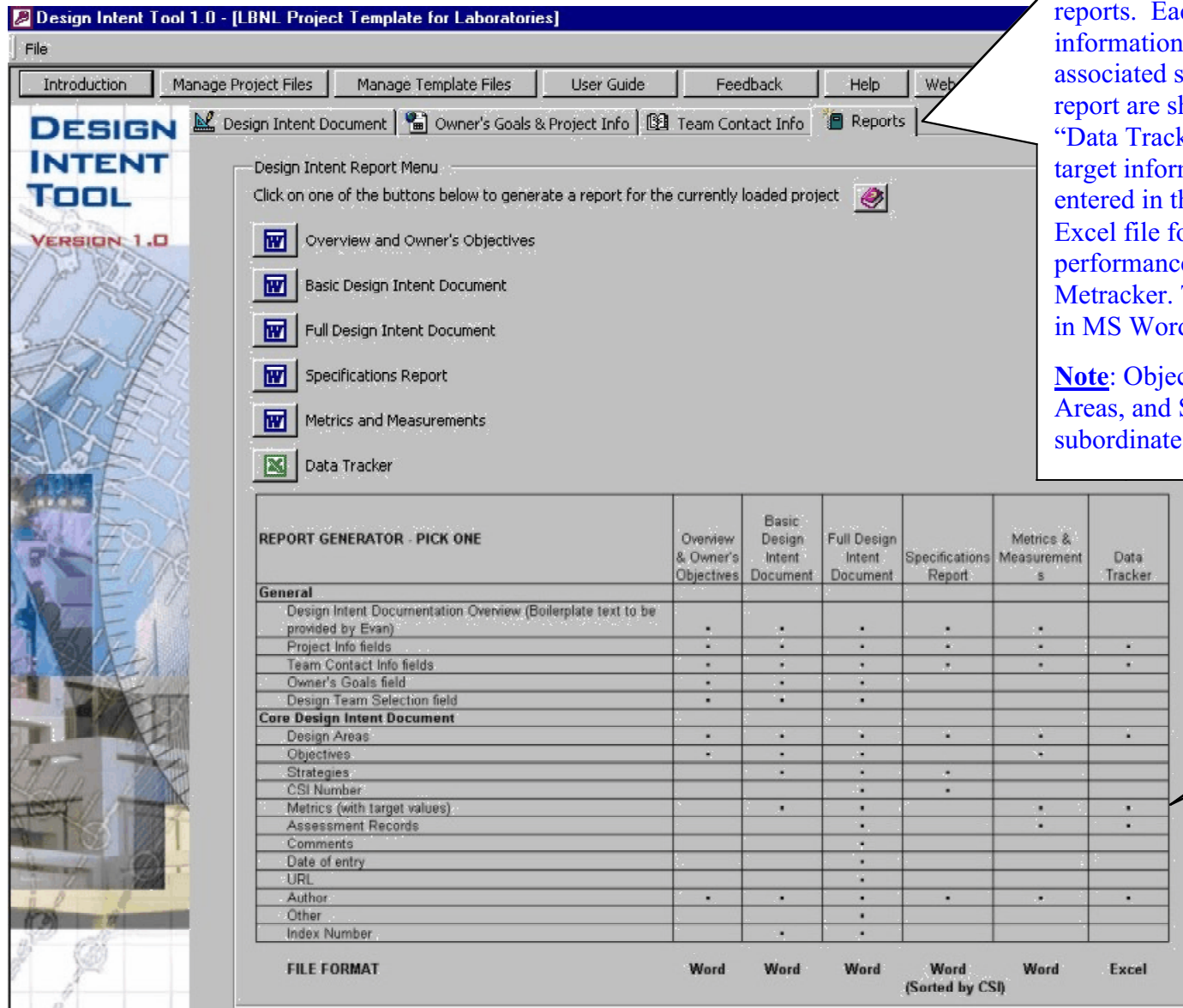
Add New Contact 

Reports Tab

REPORTS TAB:

This tab allows users to generate six different reports. Each report is composed of a set of information from the other three Tabs and associated sub-screens. The contents of each report are shown in the table below. The “Data Tracker” report provides performance target information and (other Metrics values entered in the Assessment Records) in an Excel file format. This can be imported into performance tracking tools such as Metracker. The other five reports are created in MS Word.

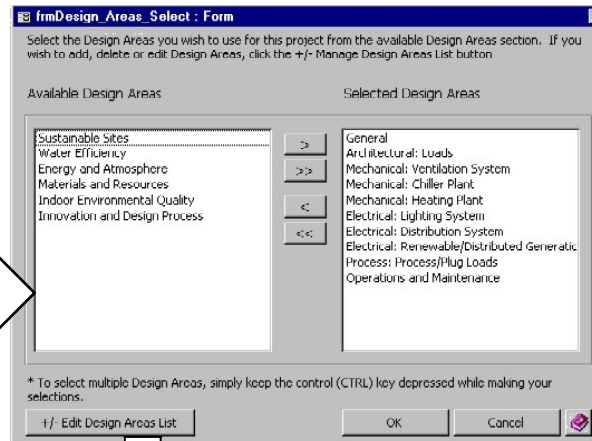
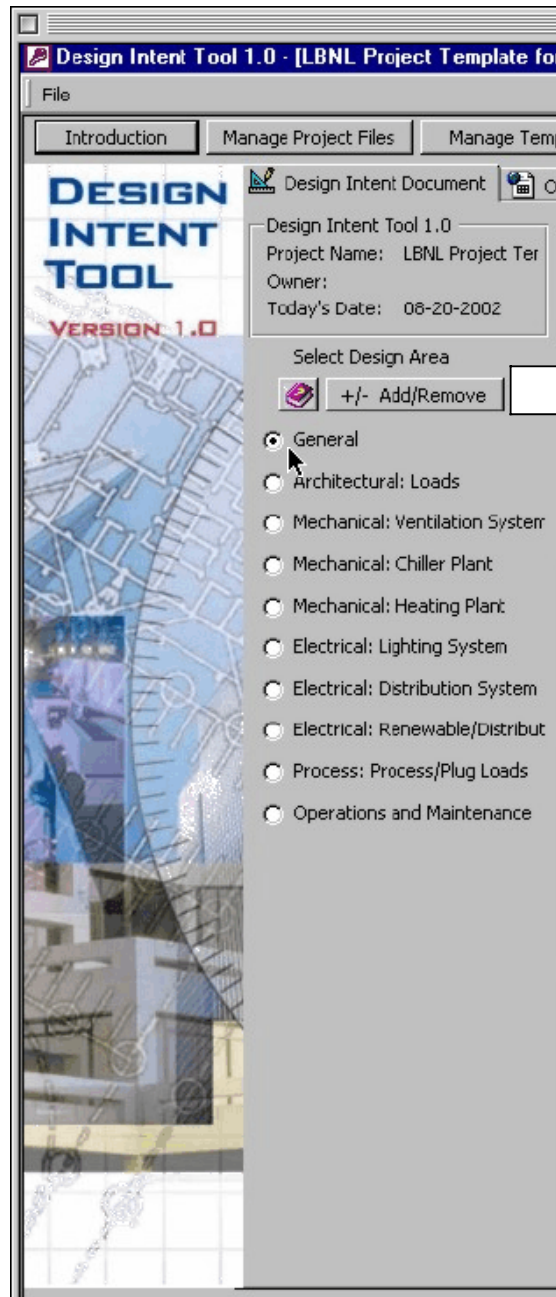
Note: Objectives are subordinate to Design Areas, and Strategies and Metrics are subordinate to Objectives.



REPORT GENERATOR - PICK ONE	Overview & Owner's Objectives	Basic Design Intent Document	Full Design Intent Document	Specifications Report	Metrics & Measurements	Data Tracker
General						
Design Intent Documentation Overview (Boilerplate text to be provided by Evan)	*	*	*	*	*	
Project Info fields	*	*	*	*	*	*
Team Contact Info fields	*	*	*	*	*	*
Owner's Goals field	*	*	*	*	*	
Design Team Selection field	*	*	*			
Core Design Intent Document						
Design Areas	*	*	*	*	*	*
Objectives	*	*	*	*	*	*
Strategies		*	*	*	*	
CSI Number			*	*		
Metrics (with target values)		*	*		*	*
Assessment Records			*		*	*
Comments			*			
Date of entry			*			
URL			*			
Author	*	*	*	*	*	*
Other			*			
Index Number		*	*			
FILE FORMAT	Word	Word	Word	Word (Sorted by CSI)	Word	Excel

Matrix shows which database fields are included in each report.

Design Areas



DESIGN AREAS DETAILS:

From the Design Intent Document Tab, the “+/- Add/Remove” button allows for customization of the available Design Areas. Design Areas can be defined/modified from the “+/- Edit Design Area” button.

Note: To select non-sequential Design Areas, keep the “CTRL” key depressed while selecting.

Del	Index No	Design Area Name	Design Area Description	Author	Other	Design Area URL	Comments
☒	1	General	This area includes whole-building information or information pertaining to multiple design areas.	Steve Greenberg			
☒	2	Architectural: Loads	The Architectural Loads area includes elements of the building and its surroundings (envelope, furnishings, landscaping, etc.) that create or affect the loads put on the	Steve Greenberg			
☒	3	Mechanical: Ventilation System		Steve Greenberg			
☒	4	Mechanical: Chiller Plant		Steve Greenberg			
☒	5	Mechanical: Heating Plant		Steve Greenberg			
☒	6	Electrical: Lighting System		Steve Greenberg			
☒	7	Electrical: Distribution System		Steve Greenberg			
☒	8	Electrical: Renewable/Distributed Generation		Steve Greenberg			
☒	9	Process: Process/Plug Loads		Steve Greenberg			
☒	10	Operations and Maintenance		Steve Greenberg			
☒	11	Sustainable Sites					
☒	12	Water Efficiency					
☒	13	Energy and Atmosphere					
☒	14	Materials and Resources					
☒	15	Indoor Environmental Quality					
☒	16	Innovation and Design Process					

Index numbers must be included on the detailed form, to facilitate sorting.

Objectives Record

DETAILED OBJECTIVES:

Pop-up screen from the main Design Intent Document provides greater detail on Strategies.

User-defined ID number

Free field for additional information

Elements in the Detailed Record screens can be added or deleted.

Users can enter any web address (URL) that provides more information, etc. If a browser is running, clicking on the URL will bring up the corresponding web page.

The current date will be auto-entered if the user clicks on the "Auto-Update Dates" button (bottom of screen) while the pointer is located in the record of interest.

Objective Name and Objective Description are migrated from the main Design Intent Document, and needn't be re-entered here.

Supplemental Comments

Design Intent Tool 1.0 - [Tbl_Lookup_Objectives]

File

Objective Record

Del	Index No	Objective Name	Objective Description	Author	Other	Objective URL	Update Date	Comments
	1	Minimize Ventilation Loads	Apply architectural solutions to minimize the amount of ventilation air while meeting all fresh air, exhaust, heating, and cooling requirements.				6/27/02	
	2	Minimize Heating and Cooling Loads						
	3	Minimize Lighting Load					6/27/02	

<<== Back to Main Design Intent Document Add New Objective Auto-Update Dates

DETAILED STRATEGIES:

This pop-up screen from the main Design Intent Document provides greater detail on Strategies.

User-defined ID number

Option to assign Construction Specifications Institute (CSI) numbers to Strategies.

Free field for additional information

Elements in the Detailed Record screens can be deleted.

Strategy Record

Design Intent Tool 1.0 - [Tbl_Lookup_Objectives]

Del	Index No	Strategy Name	Strategy Description	Author	CSI Number	Other	Strategy URL	Update Date	Comments
☒	1	Exceed Title 24 requirement by factor of 2.5 (energy use 40% of Title 24 budget)	Energy code requirements can typically be easily outperformed. Such requirements establish a baseline against which simulated performance can be compared. Title 24 is California's State Energy Code. Buildings can comply with the Code either by the prescriptive or performance method. The prescriptive method means meeting specific requirements for different end-uses (e.g. lighting and ventilation) and construction						
☒	2	Achieve LEED Platinum rating	The Leadership in Energy and Environmental Design (LEED) system is the U.S. Green Building Council's system for comprehensively rate buildings for their environmental impact. LEED Platinum is the highest rating.						
☒	3	Minimize life-cycle cost	The life-cycle cost of a building is its total cost over its entire life, including design, construction, operation, maintenance, renovation, and decommissioning; future costs are discounted to present value for comparison. Minimizing life-cycle costs usually results in higher first costs and lower operating costs than are common for typical buildings.						
☒	4	Commission	Commissioning is the process of ensuring that building elements and systems are designed, installed, programmed, and adjusted to operate as intended. Ideally, the commissioning begins early in the design process, and continues throughout the life of the building.					6/21/02	

<<== Back to Main Design Intent Document Add New Strategy Auto-Update Dates 

Strategy Name and Strategy Description are migrated from the main Design Intent Document, and needn't be re-entered here.

Free space for additional information.

Users can enter any web address (URL) that provides more information, etc. If a browser is running, clicking on the URL will bring up the corresponding web page. No ancillary characters can be added to this field beyond the URL itself.

The current date will be auto-entered if the user clicks on the "Auto-Update Dates" button (bottom of screen) while the pointer is located in the record of interest.

Assessment Record

ASSESSMENT RECORD:

Provide detailed information about metrics, and a matrix for recording and verifying measurements to ensure that the target values are attained and maintained over the project lifecycle.

Various “checkpoints” for the design and construction process. Values for Metrics are recorded here and verified against initial Target

Quantitative value of the given Metric.

Design Intent Tool 1.0 - [frmAssessmentRecord : Form]

File

Assessment Record

Metric Name: Total annual kWh/sf Target Value: Target Unit: Author:

Metric Description: Whole-building electric energy use per gross square foot of building. From building electric meter.

General Assessment Method Notes:

Measurement/Verification	Value	Assessor	Date	Verification Method
Pre-Design				
Schematic Design				
Design Development				
Contract (final design)				
Bidding				
Construction (as built)				
Project Closeout				

Assessment Record

Metric Name: Annual source BTU/sf (combined gas and electricity) Target Value: Target Unit: Author:

Metric Description: Whole-building total energy use per gross square foot of building. Source BTU/sf is calculated using XXXXX Btu/kWh of electricity and a multiplier of 1.1 for natural gas to account for transmission and distribution losses.

General Assessment Method Notes:

Measurement/Verification	Value	Assessor	Date	Verification Method
Pre-Design				
Schematic Design				
Design Development				
Contract (final design)				
Bidding				
Construction (as built)				
Project Closeout				

Assessment Record

Metric Name: Annual peak W/sf Target Value: Target Unit: Author:

Metric Description: Highest annual whole-building peak power in Watts per gross square foot of building. From building electric meter.

General Assessment Method Notes:

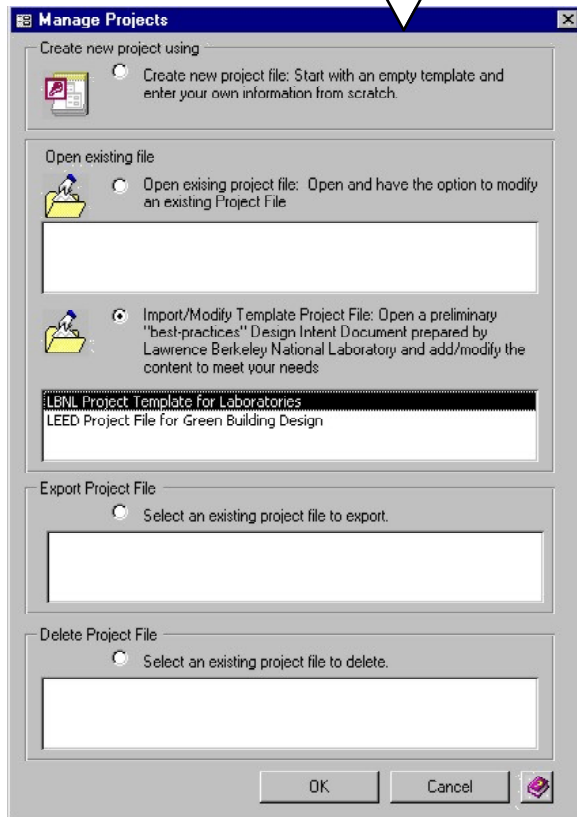
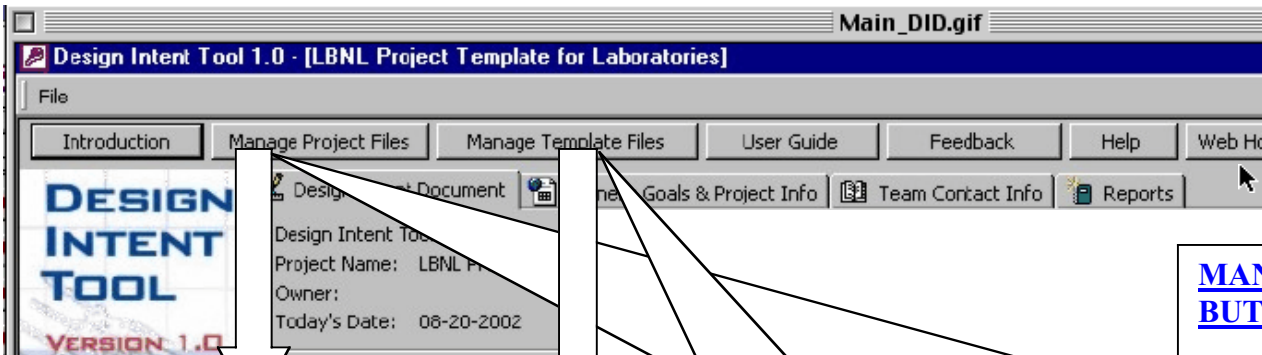
<<== Back to Main Design Intent Document Auto-Update Dates

Metric name, Target Value, and Author are carried forward from the main metrics entry page.

Technique(s) used to obtain the Value.

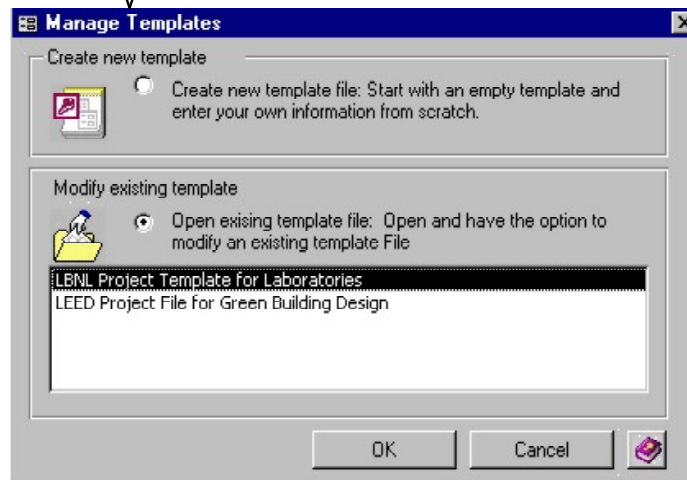
Name of individual conducting the assessment

Manage Project Files & Templates



MANAGE TEMPLATE FILES BUTTON:

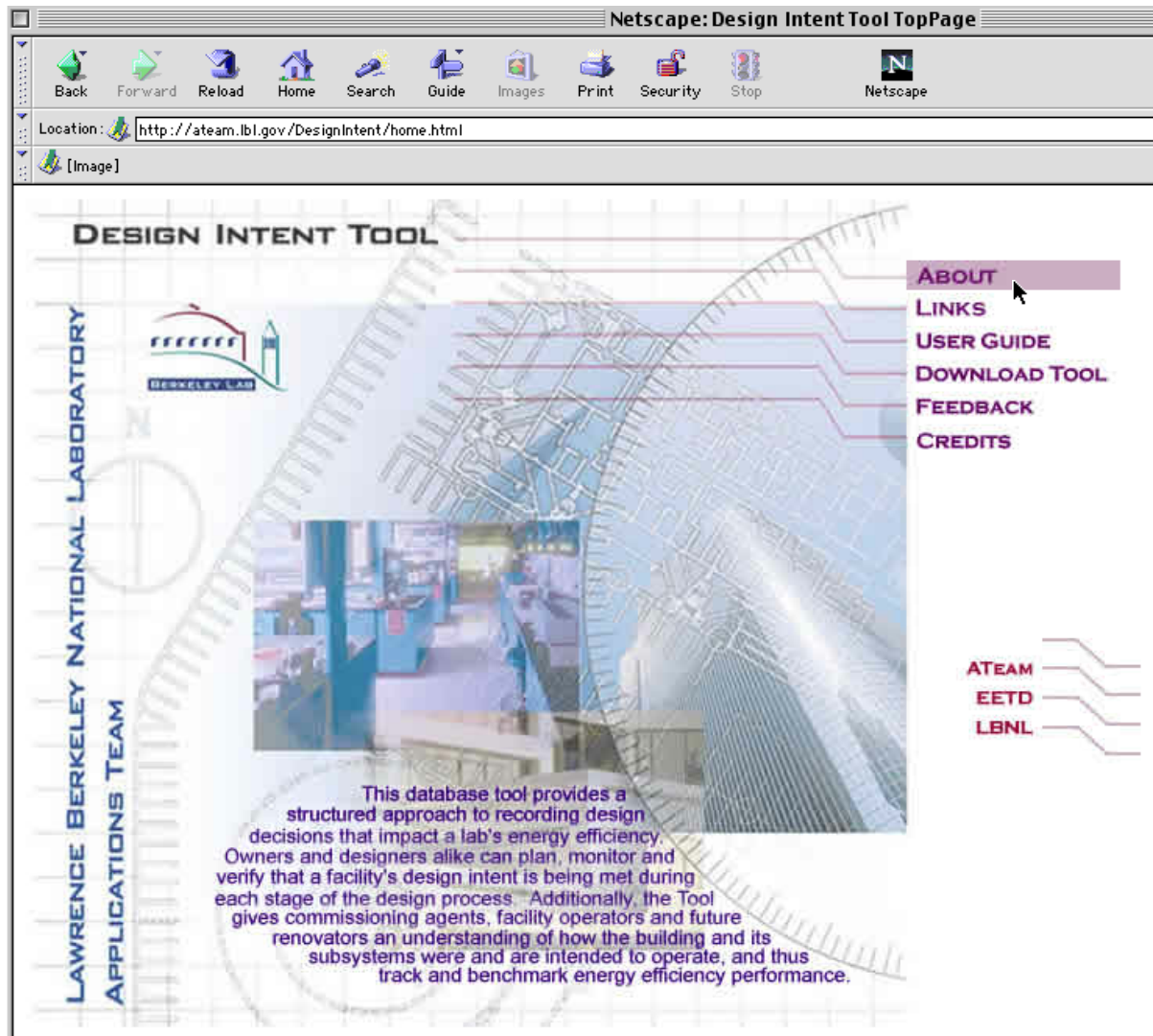
Create new Template or import and modify the Templates provided with the Tool. Modifications to the Templates are irreversible.



MAN AGE PROJECTS FILES BUTTON:

1. Create a new project file.
2. Open and modify (or delete) an existing project (e.g. from a prior session or received from another member of the design team).
3. Import pre-defined "Template Project Files" prepared by Lawrence Berkeley National Laboratory. The content provided therein offers a starting point for tailoring a Design Intent Document for a particular project.
4. On occasion, users will have multiple Project Files in their version of the Design Intent Tool and want to share a single one with someone else. To do so, use the Export Project File feature to create a separate version of the Tool containing the desired Project File.

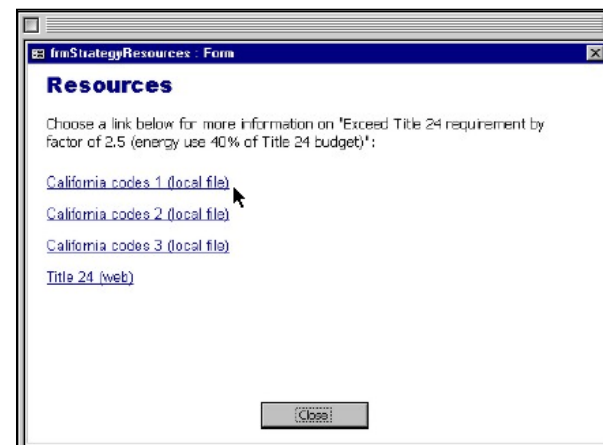
Web Home Page



HELP

Program and Content Help

Links (red-book icons ) are provided throughout the tool to context-sensitive “Program Help” (how to use the tool). Question-mark icons to the right of Objectives, Strategies, and Metrics imported via the Template Files offer “Content Help” (right) and useful links for more information. The “Help” button on the [Navigation Bar](#) links to this page. For additional assistance, the “Feedback” button on the Navigation Bar will generate an email to the Tool developers.



Frequently Asked Questions

Q. Why bother? What are the benefits of design intent documentation?

A. See “[Benefits: Why Document Design Intent?](#)”

Q. How do I get the most current version of the Tool or new Template Files?

A. Download free copies at <http://ateam.lbl.gov/DesignIntent/index.html>.

Q. Who developed the Design Intent Tool?

A. See “[Credits](#)”

Q. How do I get rid of the paperclip-shaped “Wizard” that automatically pops up when I start Access?

A. Control Panel → Add/Remove Programs → Microsoft Office 2000 → Add/Remove → Add or Remove Features → Microsoft Access Tree → Typical Wizards → "Not Available" → Additional Wizards → "Not Available"-- an X should appear → Update Now

Further Readings

Friedman, H. and M.A. Piette. 2001. High Performance Commercial Building Systems: Comparative Guide to Emerging Diagnostic Tools for Large Commercial HVAC Systems. Lawrence Berkeley National Laboratory Report No. 48629. <http://eande.lbl.gov/btp/papers/48629.pdf>

This guide compares emerging diagnostic software tools that aid detection and diagnosis of operational problems for large HVAC systems. The authors have evaluated six tools for use with energy management control system (EMCS) or other monitoring data. The diagnostic tools summarize relevant performance metrics, display plots for manual analysis, and perform automated diagnostic procedures. The comparative analysis presents nine summary tables with supporting explanatory text and includes sample diagnostic screens for each tool.

PECI. 2001. "Summary Report on Design Intent Research and Design Intent Database Tool Development Recommendations." Prepared for Pacific Gas and Electric Company. Portland Energy Conservation Inc., Portland, OR.

Presents one view of definitions and concepts to use in design intent documentation—focusing on Basis of Design and Owner's Project Requirements—and proposes the development of a design intent tool, potentially building upon an earlier version of the LBNL/PECI tool. Presents detailed results of surveys of potential users of such a tool (including Owners, Designers, and Providers). Not available for general distribution.

PECI and Marinsoft, Inc. 2001. "Identification and Preservation of Building Design Information for Use in Commissioning and Operations". Draft. Final Report (October 1) for ASHRAE TC 1.5 (Computer Applications) and 9.9 (Building Commissioning). TRP-1032. Prepared for American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE), TC 1.5 and 9.9. Other useful PECI resources and publications can be found at <http://www.peci.org/cx/index.html>

Discusses the insufficient availability and organization of building system equipment selection, performance and operation, and the need for standard methods and procedures for gathering and documenting data, with a focus on commissioning. Illustrates how highly detailed design information can be. For example, the report identifies over 150 data points for chilled water systems and over 100 for VAV systems. Report presents a detailed data schema for use in a computer-based tool for classification. Reviews related research, industry initiatives, and existing software.

Stum, K. 2002. "Design Intent and Basis of Design: Clarification of Terms, Structure and Use. (Draft)

Discusses the frequent confusion and controversy about definitions and usage terms for describing design intent documentation, design narrative, design programming, owner's project requirements, basis of design, design rationale, performance criteria, etc.

Tschudi, K. Benschine, S. Fok, P. Rumsey. 2001. Cleanroom Energy Benchmarking in High-tech and Bio-tech Industries. Lawrence Berkeley National Laboratory Report No. 47729. <http://eetd.lbl.gov/btp/papers/47729.pdf>

To understand the opportunities and potential impact energy savings strategies in "high-tech" buildings, Pacific Gas and Electric Company sponsored a project to benchmark energy use in cleanrooms in the electronics (high-tech) and biotechnology industries. Both of these industries are heavily dependent intensive cleanroom environments for research and manufacturing. In California these two industries account for approximately 3.6 million sq. ft. of cleanroom and 4349 GWh/yr. Little comparative energy information on cleanroom environmental systems was previously available. Benchmarking energy use allows direct comparisons leading to identification of best practices, efficiency innovations, an highlighting previously masked design or operational problems.

Wilkinson, R.J. 1999. "The Commissioning Design Intent Narrative". ASHRAE Journal, pp. 31-35 (April).

Early work defining the uses of design intent documentation, with emphasis on the applications for commissioning. Discusses how design intent documentation fits into the broader design, construction, and operation phases of a building's life-cycle. Articulates many of the benefits of design intent documentation, including an important discussion of how it can reduce liabilities of various parties involved (rather than increasing it, a concern that is sometimes voiced).

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Sponsored by:

The California Energy Commission
California Institute for Energy Efficiency

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