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# COMPUTER AIDED WEBTOOLS FOR INDUSTRIAL ENERGY AUDITS



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# Introduction

## ■ Motivation

- ❑ Many documents, manuals, data forms, tools and calculations are involved and available on an individual basis.
- ❑ There has not been an integrated environment with a logical approach that links all resources and tools together.
- ❑ Many computer aided environment has been design for various situation. There is an opportunity to develop a logical computer environment model for energy audit processes.

# Introduction

## ■ Objectives

- ❑ To establish an integrated computer-aided training/audit tool for industrial energy audits in a structured, logical and practical way.
- ❑ To support the kind of diagnosis-solution problem solving required to perform a competent energy audit.

# Introduction

## ■ Project Goals

- ❑ Centric online data collection tool
- ❑ Supportive tools, up and run 24/7/365
- ❑ Shallow level but comprehensive to enhance the success rate of accomplishing the goal of users
- ❑ User friendly manner
- ❑ Security embedded for sensitive data
- ❑ Information can be accessed easier and quicker
- ❑ Monitoring tool for future development

# Introduction

## ■ Concepts

- The concept is the integration of necessary components of tasks. A single platform that will allow users to navigate throughout relevant processes in focus way.
- Provides a step-by-step cycle of strategy analysis, system design, system performance monitoring, and system improvement.

# Introduction

## ■ Development Background

- Wu and Khanna (2007) proposed the conceptual structure of a computer-aided audit workbook as a complete guide to energy audit processes. The conceptual structure is outlined in a task-centered manner which integrates all relevant entities for the audit processes.
- It is intended to support the kind of diagnosis-solution problem solving required to perform a competent energy audit.

### Reference

Wu, B. and Khanna, S. (2007), 'Promoting awareness of Industrial Energy Efficiency and Waste Reduction in the University Student Population', ASEE 2007 conference, Hawaii

What is the overall energy  
audit processes look like?

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# Energy Audit Procedures

- Utility Analysis
- Equipment Identification
- Baselineing
- Walk-Through Audit
- Evaluate Savings

How does the Webtools  
involved?

Utility Analysis

Equipment Identification

Baselining

Walk-Through audit

Evaluate Savings

Time

Process flow

Data Gathering & Analysis  
 Development of datasheets, data collections  
 List of recommendations

Auditors

Supporting flow

Pre-audit forms      Check List      Post-audit forms

# WEBTOOLS

Project Manager

IAC Archive

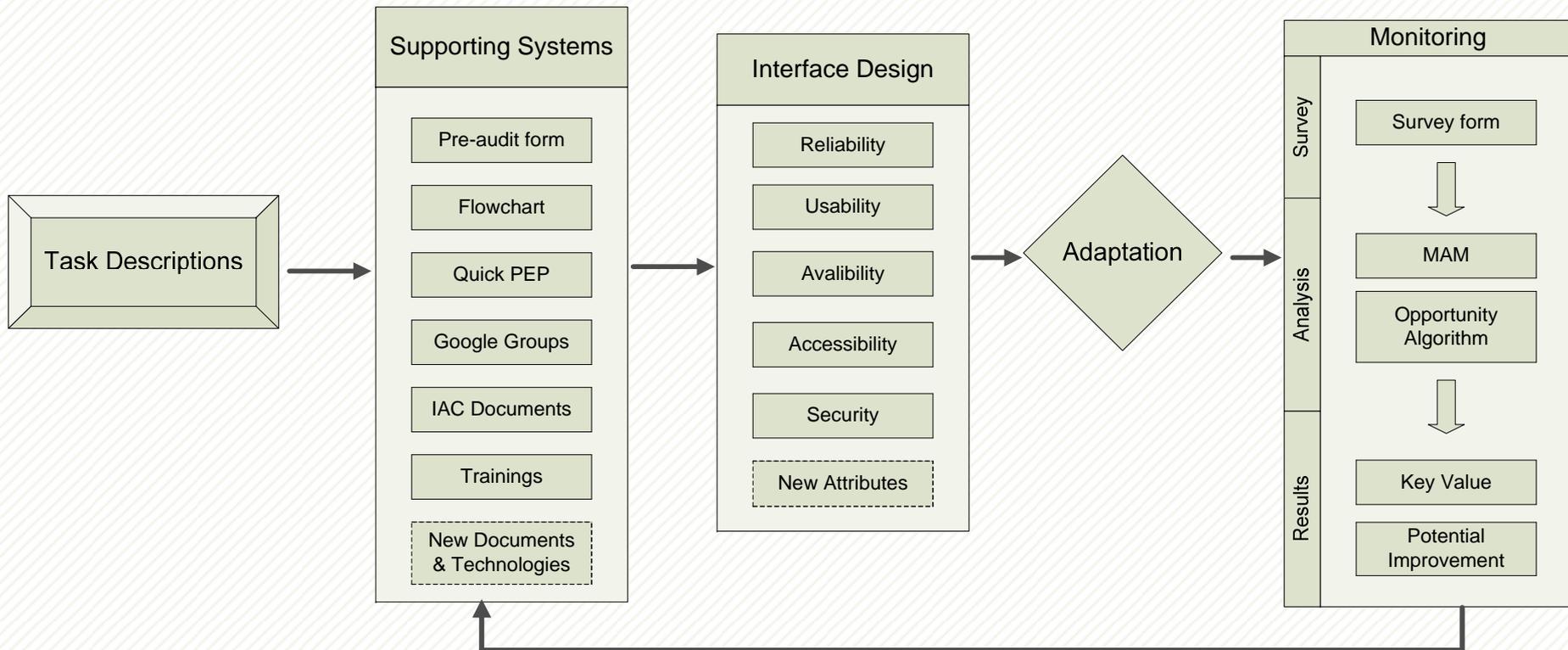
Source Books

DOE Website

Disciplines

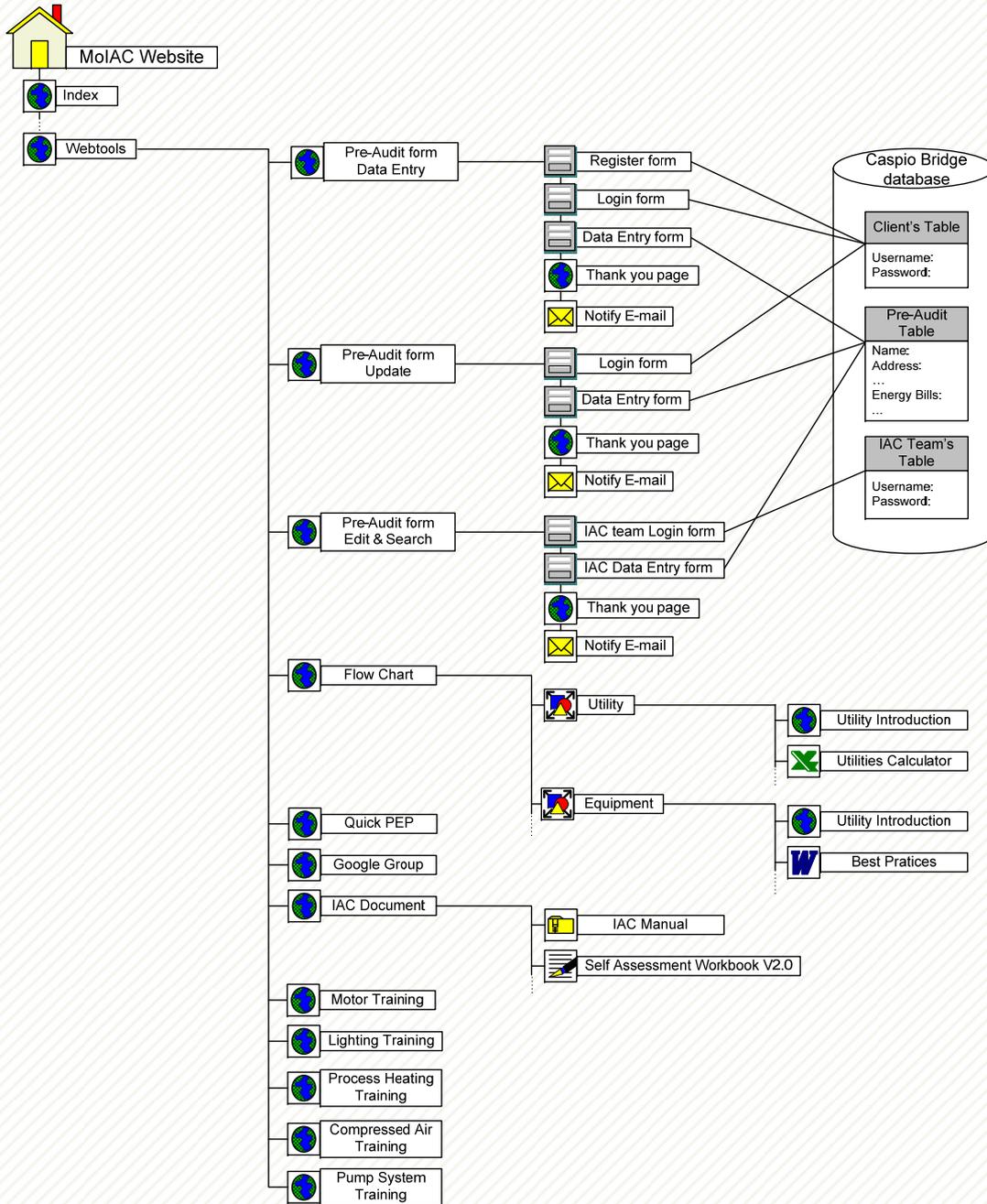
How it is developed?

# Computer-aided development model



IAC Website at  
<http://iac.missouri.edu/>

# Navigation Site Map



## INDUSTRIAL ENERGY AUDIT TOOLS

### MOIAC ONLINE TOOLS

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Pre-Audit Form DATA ENTRY

This preaudit form is for potential clients or MoIAC team members to create new entry of companies' record before conducting an industrial energy audit at the facility.

Pre-Audit Form UPDATE

This update form is for clients or MoIAC team members to update information in this form. Please have your password ready.

Pre-Audit Form EDIT & SEARCH

This search & edit is **only for IAC team members** to search for companies' record and work on pre-audit process to prepare for a trip to the company. For Tutorial, [Click here.](#)

### MOIAC ENERGY AUDIT FLOWCHART

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Flow Chart

The flowchart shows the process flow of Industrial Energy Audit for Mo IAC center. Tools and calculation tables are attached to the flowchart.

### ENERGY AUDIT LINKS

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Quick PEP

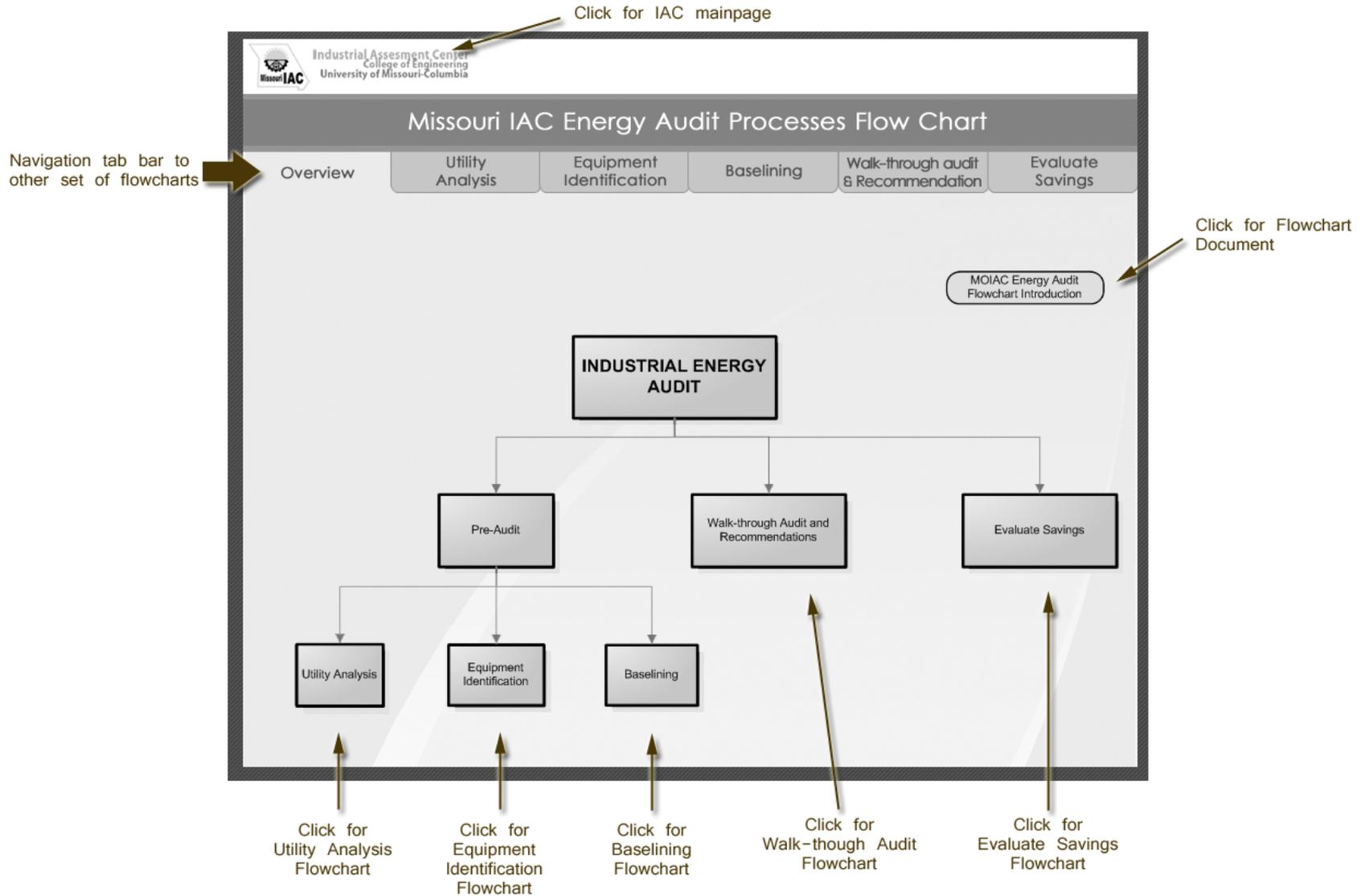
Quick PEP is a pre-assessment tool from Department of Energy.

Google Group

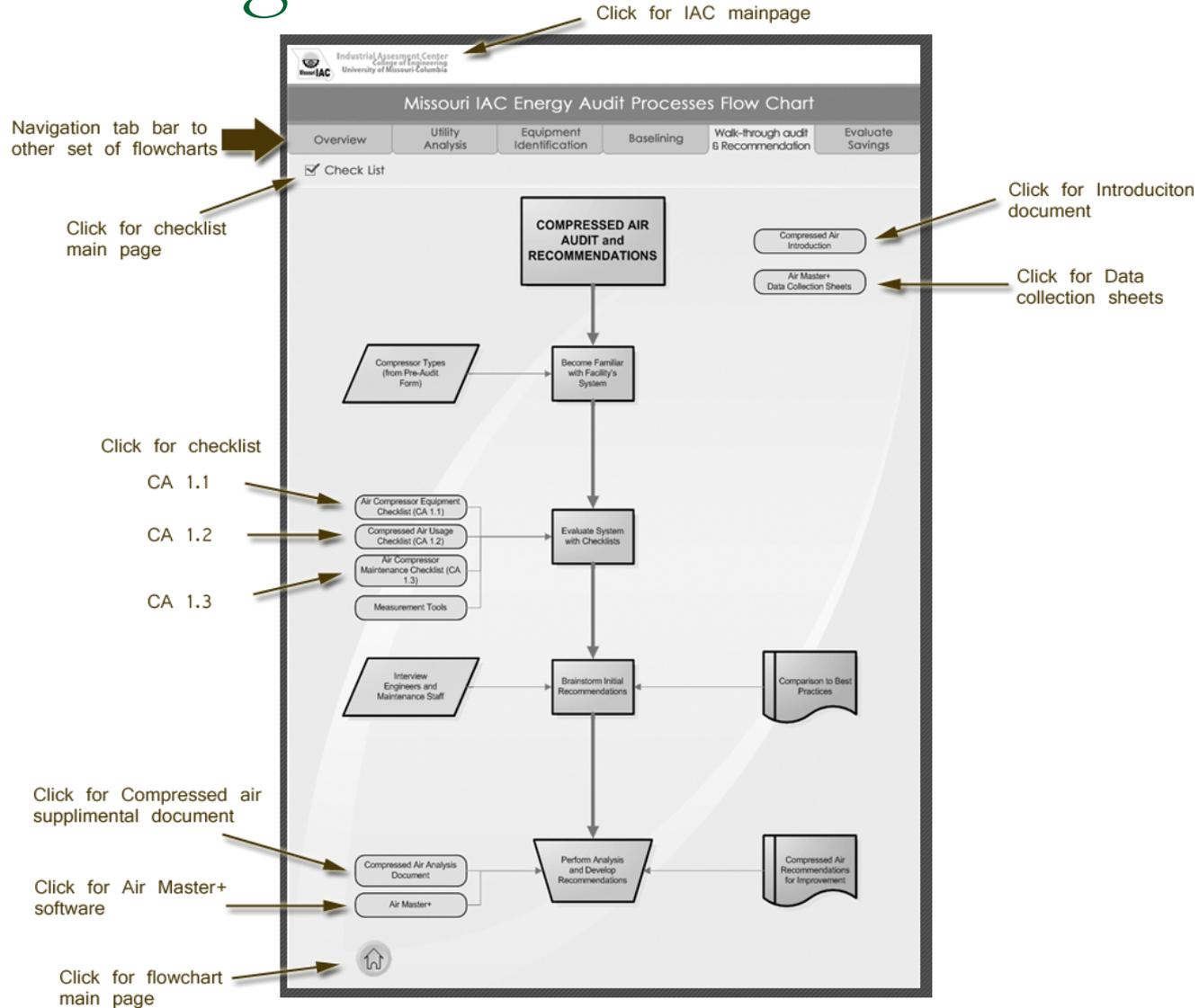
This is a link to our MoIAC discussion board **for our MoIAC team members** . For Google Tutorial, [click here.](#)

This link will navigate you to list of documents that

# Web Navigation



# Web Navigation



# Survey

- Survey is used as a monitoring tool for a future development of the Webtools online.
- The current survey includes question about overall usage of this site and, particularly, the pre-audit form online.

Survey site:

<http://iac.missouri.edu/tools/survey.html>

# Benefits gained from the project

## ■ Current Benefits

- ❑ Provides a framework of a web-based navigation experience with integration of all necessary activities in one site
- ❑ Users can use the Webtools online as a portal to all sources necessary to conduct industrial energy audits.
- ❑ Complication of sharing resources is reduced since resources are archived in centralized database center.
- ❑ Users can gain access the Webtools online 24/7/365.
- ❑ Users can navigate logically by the flow of content.
- ❑ Time spending on searching for irrelevant information is shorten down.
- ❑ Web Developer can understand what user needs to interact with website for a future development.

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# Document storage & sharing

- Eliminates need for hard copies of important documents and manuals
- Reduces paper use
- Eliminates the confusion of “who has what”

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# Report drafting & completion

- Central location for all information collected by out center.
- Accessible anywhere there is an internet connection.
- Allows organized use of documents.

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# Resource Availability

- IAC Manual
- Self Assessment Workbook
- Dept. of Energy Tip Sheets
- Dept. of Energy Source Books
- Training Videos

# Enhanced communication between client and center

- Client can submit and update a pre-audit form at any time.
- Client can conduct a qPEP by going through link.
- Clients can easily link to Doe/IAC related websites and databases.
- Client can gain knowledge of the center.
  - Progression/steps of an audit.
  - Get to know center personnel.

# Benefits gained from the project

## ■ Future benefits

- ❑ Team members understand and aware of their responsibility of the energy system assigned by navigate through the interactive flowchart.
- ❑ Team members will be able to learn cross-functional energy system from flowcharts and training section interactively.
- ❑ Increase a successful communication both within organization and clients.

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# Conclusion

- The framework as a guidance to achieve the integration of task-centered design, Interface design and monitoring perspective for web-designer of the energy audit processes
- The downside is that users have to learn the new environment to work with this tool.

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# Future development

- The development is not yet having a robust calculation online tools. Application that would support an automated energy cost savings calculation would be a great topic to explore.

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# Comments & Questions

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