BUILDING ENERGY SIMULATION

For Users of EnergyPlus, SPARK, DOE–2, BLAST, Genopt,
Building Design Advisor, ENERGY–10 and their Derivatives

User News

What's New ?

........EnergyPlus, Beta Version 1.0.1

A beta version of EnergyPlus 1.0.1 will be released in late September. You may check the status of the beta version by visiting our web site and clicking "EnergyPlus" in the left menu:

http://SimulationResearch.lbl.gov

......Download DOE-2.1E Basics

Dr. Sam C. M. Hui, head of the DOE-2 Resource Center in Hong Kong, has scanned the DOE-2.1E Basics Manual and organized it into files that can be viewed or downloaded from our web site. Go to http://SimulationResearch.lbl.gov and click "Documentation" under DOE-2 in the left menu, then click on DOE-2.1E Basics. Alternatively, you may send email (klellington@lbl.gov) and request the DOE-2.1E Basics Manual on CD.

.........Swiss DOE-2 Resource Center

René Meldem, DOE-2 consultant and head of the Swiss Resource Center, has relocated. Please note his new address:
BG Ingenieurs Conseils SA
61 Avenue de Cour
Case Postale
Lausanne, Swtzerland
rene.meldem@bg-21.com
Tel: +41 21 618 1111
Fax: +41 21 618 1122

........Download the *ibpsa*NEWS

IBPSA (the International Building Performance Simulation Association) is a non-profit international society of building simulation researchers, developers and practitioners dedicated to improving the built environment. Vol. 11, No. 1 of their newsletter may be downloaded from **http://www.ibpsa.org**

....Everybody Talks About the Weather

Here's your chance to get two "classic" articles from the *Monthly Weather Review* ... Free! Go to p. 9.

What's Inside ?

EnergyPlus Interoperability

Acquisition of Building Geometry from IFC-Compatible CAD Tools

The use of energy simulation tools has historically been hampered by the difficulty involved in gathering and accurately entering the myriad building description data required for simulation. The International Alliance for Interoperability (www.iai-na.com) is developing a common data model for the exchange of data between software applications for the Architectural/Engineering/Construction and Facilities Maintenance Industry (AEC/FM). This data model is called Industry Foundation Classes (IFC). Software implementations based on the IFC data model can easily share input and output data.

EnergyPlus Interoperability with CAD

Several popular CAD tools now have implementations of IFC-compliant import/export capabilities that allow the geometry created in these tools to be written to, and read from, IFC data files. Commercially available versions of these tools will likely be based on different released versions of the IFC data model, including the R1.5.1, R2.0, and the 2x platforms. Olof Granlund Oy (www.granlund.fi) offers BSPro COM-Server, a software development middleware tool (www.bspro.net) that provides access to IFC data files and is based on all release versions. BSPro COM-Server, tailored to the building services sector of the AEC/FM Industry, includes a client software module that automatically acquires the geometry of spaces, walls, windows, doors, floors, and roofs from an IFC data file, and generates an EnergyPlus input data file (IDF) containing this building geometry. The EnergyPlus client to the BSPro COM-Server, referred to as the IFCtoIDF utility [see *User News,* Vol. 21, No. 5, p. 4 "*The BSPro COM-Server: Interoperability Among Software Tools using Industry Foundation Classes*"], has been developed as a Windows DLL using Microsoft Visual C++. The current version of the IFCtoIDF utility is compatible with the EnergyPlus Version 1.0 Input Data Dictionary. An executable version of the utility has been distributed as part of EnegyPlus, Version 1.0. Olof Granlund Oy is making a runtime version of their server available to registered EnergyPlus users free of charge.

Limitations of the IFCtoIDF Utility

Please note that the IFCtoIDF utility is still in Beta testing. This utility, along with the BSPro COM-Server and several other software tools, has been officially certified by the IAI as being compliant with IFC Release 2.0. However, this does not mean that the utility is capable of seamlessly importing all data required for an EnergyPlus simulation from an IFC data file. The utility focuses on geometry only at this point. For example, construction material characteristics are currently defaulted in the resulting IDF. These data are not imported from an IFC data file simply because there is not yet an IFC-compliant tool that provides a user interface for inputting material characteristics. Furthermore, interoperability based on the object-oriented IFC standard is still a relatively new technology. Even the seemingly simple exchange of geometry representing objects such as a space and the parts of walls, floors and ceilings that bound this space can result in misunderstandings between different tools.

More experience in exchanging data between a wide variety of software tools is required before this technology matures to a stage of full and foolproof functionality.

For more information, please refer to the paper on page 3 titled:
"*BSPro COM-Server -- Interoperability Among Software Tools Using Industry Foundation Classes* "

EnergyPlus Version 1.0

A beta version of EnergyPlus 1.0.1 will be available in late September.
To download, please go to http://SimulationResearch.lbl.gov > EnergyPlus 1.0.1

Join the EnergyPlus User Group

The developers of EnergyPlus have formed a support group in order to foster discussion and maintain an archive of information for program Users. We invite questions about program usage and suggestions for improvement to the code. This group is not meant to replace the primary support at EnergyPlus-Support@GARD.com.

The main page:	http://groups.yahoo.com/group/EnergyPlus_Support
Send messages to:	EnergyPlus_Support@yahoogroups.com
Files on the web site include these:	SetEPlus.exe -- the usual install file
	Readme.pdf -- updated readme file
	V1ReleaseSource.zip -- zip of the current source code -- will be updated soon!
	Energy+.idd -- unbundled Data Dictionary
	SetEPlusPatch01.exe -- the patch install. Includes updated EnergyPlus.exe, documentation, etc. but no new input files (input files did not change).

For more information on EnergyPlus, please go to

http://www.eren.doe.gov/buildings/energy_tools/energyplus

Recent Reports

This report is available (hard copy) from Kathy Ellington. Please fax your request to (510) 486-4089.

BSPro COM-Server
Interoperability Among Software Tools Using Industry Foundation Classes

Antti Karola, Hannu Lahtela and Reijo Hänninen, Olof Granlund Oy, Finland
Rob Hitchcock, Lawrence Berkeley National Laboratory, USA
Qingyan Chen, Massachusetts Institute of Technology, USA
Stephen Dajka, AEA Technology, Canada
Kim Hagström, Halton Group, Finland

Abstract

The continuing development of the Industry Foundation Classes (IFC) standard by the International Alliance for Interoperability (IAI) creates new possibilities for achieving interoperability for design software through the use of a common object model of the building and its open data transfer standard. Several architectural CAD tools are already IFC compliant. However, in-depth knowledge of the highly complex IFC object model is required to develop IFC-compliant software. It has proven quite difficult to read the huge amount of building data stored in an IFC file, extract the information needed by a particular application, and correctly update the IFC file with new data. To make this work easier for developers not familiar with the IFC, Olof Granlund Oy has developed a new development tool, BSPro COM-Server for IFC Files. Using this tool, a software developer of new or existing tools can achieve IFC compatibility with a quite reasonable amount of work.

Proc. IBPSA Conference, Building Simulation 2001, Rio de Janeiro, Brazil, August 13-15, 2001

The

DOE-2

Puzzler

Question:

I need to find out how DOE-2 computes defrost energy for RESYS (variable #125 in SYSTEMS). Right now, it appears to be 4% of the nominal size of the heating capacity in Btu/hr. For instance, a 3-ton heat pump, (36,000 Btu/hr) would have an hourly defrost energy of 1470 Btu/hr. It doesn't appear to vary with outdoor temperature. Further I assume this is a straight resistance load in terms of how it ends up on Heating Electric kW (Variable #46). So a defrost energy of 1470 Btu/hr would end up 0.431 kW added. Correct?

Answer:

In DOE-2, defrost energy depends on some user inputs. The keywords are DEFROST-TYPE and DEFROST-CTRL:

DEFROST-TYPE (code-words = RESISTIVE or REVERSE-CYCLE)
     DEFROST-TYPE = RESISTIVE   means the defrost energy will be charged to electricity.

DEFROST-CTRL (code-words = TIMED or ON-DEMAND)
     DEFROST-CTRL = TIMED   does a calculation that does not depend on outside conditions: defrost is done at a fixed time interval.
     DEFROST-CTRL = ON-DEMAND gives a defrost energy calculation that depends on outside drybulb temperature and humidity ratio.

The defaults for RESYS are TIMED and RESISTIVE.

With these defaults the calculation is:

```
c-------- DefF : fractional defrost time
          DefF  = 0.058333
          DefPwr = <RESIST-CAP-RATIO> * HPCAPT
          HPDef = DefPwr * DefF
```

HPCAPT is the zone heat capacity; basically the nominal heat capacity of the heat pump. RESIST-CAP-RATIO is "the ratio of the resistive coil capacity to the heating capacity of the heat pump rated at 47°F. The default is 0.7."

Taking the defaults, we come up with:

```
HPDef = .058333 * 0.7 * HPCAPT = 0.0408331 * HPCAPT
```

which is close to what you are seeing; your calculation of 0.431 kW is correct.

The value 0.058333 is hard wired and cannot be modified by the user. Note also that defrosting only takes place if the outdoor temperature is less than DEFROST-T (default is 40°F).

Please email your "DOE-2 Puzzler" questions to klellington@lbl.gov

GenOpt 1.1
Generic Optimization Program

New in GenOpt 1.1 are an additional algorithm for multi-dimensional optimization, algorithms for one-dimensional optimization, and an algorithm for parametric runs in a multi-dimensional space. The new version also allows processing of multiple function values and has an improved graphical user interface.

GenOpt is a multi-parameter optimization program, available free of charge from LBNL. It automatically finds the values of user-selected design parameters that minimize an *objective function*, such as annual energy use, calculated by an external simulation program like EnergyPlus, SPARK, DOE-2, BLAST, TRACE, TRNSYS, etc. GenOpt can be used with any simulation program that has text-based input and output. It also offers an interface for adding custom optimization algorithms to its library.

Genopt 1.1 (with user manual) may be downloaded from

http://SimulationResearch.lbl.gov > GenOpt

San Diego Gas & Electric

Whole Building Performance Training

SDGE
A Sempra Energy company

REGISTER AT HTTP://WWW2.SDGE.COM/SEMINAR

September 13 (Thursday) 8:30 am to 4:00 pm	**H-P Design Strategies: Lighting, Windows and Building Envelopes with EnergyPro 3.0**
September 14 (Friday) 8:30 am to 11:30 am	**Mechanical System Design/Modeling With EnergyPro 3.0**
September 14 (Friday) 1:00 pm to 4:30 pm	**Advanced Building Modeling with EnergyPro 3.0**

On June 27, 2001, the California Energy Commission approved **PERFORM 2001** as an alternative calculation method computer program for use in demonstrating compliance

with the 2001 building energy efficiency standards for non-residential, high-rise residential and hotel/motel buildings. **PERFORM 2001** calculates building energy consumption for space heating, space cooling and domestic hot water heating, and compares the energy consumption of the building design against the requirements of the standards.

PERFORM 2001
 Cost: $250
 Order No. P400-04-017
 Program and Manual on
 CD-ROM from:

Calif. Energy Commission

Attn: Publications Unit

1516-9th Street, MS-13

Sacramento, CA 95814

Recent Reports

These reports are available from Kathy Ellington Please fax your request to (510) 486-4089.

LBNL-48284

Use Of Whole Building Simulation In On-Line Performance Assessment: Modeling And Implementation Issues

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College Station, TX 77843

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ABSTRACT
The application of model-based performance assessment at the whole building level is explored. The information requirements for a simulation to predict the actual performance of a particular real building, as opposed to estimating the impact of design options, are addressed with particular attention to common sources of input error and important deficiencies in most simulation models. The role of calibrated simulations is discussed. The communication requirements for passive monitoring and active testing are identified and the possibilities for using control system communications protocols to link on-line simulation and energy management and control systems are discussed. The potential of simulation programs to act as "plug-and-play" components on building control networks is discussed.

Proc. IBPSA Conference, Building Simulation 2001, Rio de Janeiro, Brazil, August 13-15, 2001.

LBNL-48393

Incorporating LCA Tools in Integrated Simulation Environments

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ABSTRACT
In this paper we address the issue of building data schema evolution in integrated simulation environments, as seen from the perspective of incorporating LCA tools within these environments. First we describe the key features of an integrated simulation environment designed for expandability, focusing on a) the mechanism for the expansion of the integrated environment, and b) its overall system architecture that allows processes and data to be added to the system without modifications or restructuring of existing code. We then focus on how the data schema allows the inclusion and maintenance of specialized construction objects bearing LCA data. Finally, we discuss various integration issues that arise from modeling capabilities and idiosyncrasies of individual simulation and analysis tools.

Analyzing Thermal Performance Of Building Envelope Components Using 2-D Heat Transfer Tool With Detailed Radiation Modeling

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ABSTRACT
THERM is a freely available, user-friendly two-dimensional heat transfer model for analyzing the impacts of thermal bridges in building components such as windows and doors. This paper begins by presenting THERM as a tool for analyzing individual building components as well as envelope assemblies. The significance of THERM's detailed radiation heat transfer model, which incorporates a view factor based radiation heat transfer algorithm, is then presented in detail. Radiation heat transfer plays a significant role in projecting building components (i.e., Greenhouse windows, skylights, etc.), and projecting wall sections. The difference between results using a traditional black body assumption and the detailed radiation model can be as high as 30%.

Recent Reports

This report is available (hard copy) from Kathy Ellington. Please fax your request to (510) 486-4089.

Improvement of Urban Thermal Environment by The Management of Heat Discharge Sources and Surface Modification in Tokyo

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Abstract

This paper analyzes the implications of anthropogenic heat discharges into the urban thermal environment of Tokyo. Heat discharges by the representative buildings were simulated using the **DOE-2** building energy simulation model with accounting for the heat storage and, thus, the delay effect. A geographical information system was used to obtain heat discharge distribution throughout Tokyo, based on the heat discharges of representative buildings. A mesoscale analysis of the urban climate was carried out by the Colorado State University Meteorological (modified) Model. Improvements of the urban thermal environment by various measures and their effectiveness were evaluated for two types of scenarios: (1) those related to the management of heat discharge sources, and (2) urban surface modification. The maximum improvement of average temperature for daytime was found 0.47°C (at noon) by greening the areas around the buildings in Tokyo. Similarly, the maximum improvement of average temperature in the evening was found 0.11°C by discharging all heat to the ground.

VisualSPARK *Version 1.0*

Available from Lawrence Berkeley National Laboratory, *VisualSPARK 1.0 allows you to build customized models of complex physical processes by connecting calculation objects. It is aimed at the simulation of innovative and/or complex building systems that are beyond the scope of programs like DOE-2 and EnergyPlus.*

The main elements of VisualSPARK are a **user interface**, a **network specification language**, a **solver** for solving simultaneous algebraic and differential equations, and a **results processor**. With the network specification language you create equation-based calculation objects, and link the objects into networks that represent a building's envelope or HVAC components or systems. The solver solves this network for user-specified input parameters. With the results processor you graphically display the results of the calculation. VisualSPARK runs under the Windows 95/98/NT/2000, SunOS, Solaris, Linux and HPUNIX operating systems.

VisualSPARK costs $250. To purchase the program, go to
http://SimulationResearch.lbl.gov > VisualSPARK > Purchase

If you would like to get an idea of what the program does before purchasing it, you can review the SPARK User's Manual, which can be downloaded from http://SimulationResearch.lbl.gov > SPARK

VisualSPARK was developed by the LBNL Simulation Research Group and Ayres Sowell Associates, with support from the U.S. Department of Energy, Drury Crawley, program manager

http://SimulationResearch.lbl.gov > SPARK

DOE-2

PC Version of DOE-2.1E from ESTSC

DOE-2.1E (version 110) for Windows is an updated version of DOE-2. Cost is as follows:

- $ 300 U.S. Government, non-profit Educational
- $ 575 U.S., Mexico, Canada
- $ 1075 Other Foreign

DOE-2 Documentation on a CD - Cost US$100

What is included on the CD?

- DOE-2 Reference Manual (Part 1)
- DOE-2 Reference Manual (Part 2)
- DOE-2 Supplement to the Reference Manual (2.1E)
- DOE-2 BDL Summary (2.1E)
- DOE-2 Engineers Manual (2.1A)

What Isn't included on the CD?

- DOE-2 Sample Run Book (2.1E)

- DOE-2 Basics (2.1E)

- Update Package #1:
  Changes and corrections to DOE-2.1E Basics, the Supplement and BDL Summary

- Update Package #2:
  Corrections to the BDL Summary and Supplement for DOE-2.1E. For Version 107 of DOE-2.1E.

- Update Package #3:
  Corrections to Appendix A of the Supplement.

Where to Obtain Printed Documentation:

The Sample Run book must be purchased separately from NTIS; information is at http://SimulationResearch.lbl.gov > DOE-2 > Documentation

DOE-2 Basics Manual and Update Packages 1, 2 and 3 are scanned pdf files that may be downloaded or printed from our web site: http://SimulationResearch.lbl.gov > DOE-2 > Documentation

Printed pages from the Update Packages are then to be inserted into the DOE-2 manuals. Note that Update Packages are **not** cumulative and each contains different information. You **must** download all three packages to update the DOE-2 documentation completely.

Order Software and Documentation

Ed Kidd
NCI Information Systems, Inc.
Energy Science and Technology Software Center
P.O. Box 1020
Oak Ridge, TN 37831

Phone: 865/576-1037
Fax: 865/576-6436
Email: estsc@adonis.osti.gov

DOE-2 Help Desk

Contact the Simulation Research Group with your questions (email preferred) email: klellington@lbl.gov, Phone: (510) 486-5711, Fax: (510) 486-4089

DOE-2 Training

Private or group DOE-2 courses for beginning and advanced users: Phone Marlin Addison at (602) 968-2040, or send email to marlin.addison@doe2.com

ENERGY-10, Version 1.3 with WeatherMaker

Version 1.3 of ENERGY-10 is now available. It includes the much-anticipated *WeatherMaker* function. *WeatherMaker* allows users to create their own weather files based on information available from nearly 4,000 weather stations throughout the U.S. Revisions to the program itself include some minor fixes, an improved and expanded Help section, and greater clarity in titling and identification of various sections. Contact the Sustainable Buildings Industries Council for more information, or to order your upgrade disc (the cost is $15, which covers production and shipping).

ENERGY-10, written in C^{++}, is a design tool for smaller residential or commercial buildings that are less than 10,000 ft^2 floor area, or buildings that can be treated as one- or two-zone increments. It performs whole-building energy analysis for 8760 hours/year, including dynamic thermal and daylighting calculations. ENERGY-10 was specifically designed to facilitate the evaluation of energy-efficient building features in the very early stages of the design process.

Input: Only four inputs required to generate two initial generic building descriptions. Virtually everything is defaulted but modifiable. As the design evolves, the user adjusts descriptions using fill-in menus (utility-rate schedules, construction details, materials).

Output: Summary table and 20 graphical outputs available, generally comparing current design with base case. Detailed tabular results also available.

Platform: PC-compatible, Windows 3.1/95/98, Pentium processor with 16 MB of RAM is recommended.

Douglas K. Schroeder
1331 H Street N.W., #1000
Washington, DC 20004

Tel: 202.628.7400 ext 210
Fax: 202.383.5043
www.sbicouncil.org

Sustainable Buildings Industry Council (SBIC)

We have two very old, but useful, articles from the *Monthly Weather Review* by H.C.S. Thom that we are willing to share. Please fax (510.486.4089) or email (klellington@lbl.gov) if you would like copies of:

1. *The Rational Relationship Between Heating Degree Days and Temperature*, **Vol. 82, No. 1, 1954**

2. *Normal Degree Days Above Any Base by the Universal Truncation Coefficient,* **Vol. 94, No. 7, 1966**

Cool Web Site of the Month!

Get a (whirly) bird's eye view of a trip from the Golden Gate Bridge to Lawrence Berkeley National Laboratory by visiting

http://www-library.lbl.gov/teid/tmPhoto/gallery/QTVR/PhotoQtvr.htm

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Building Design Advisor 2.0

Decision making through the integrated use of multiple simulation tools and databases

The **Building Design Advisor (BDA)** is a Windows program that addresses the needs of building decision-makers from the initial, schematic phases of building design through the detailed specification of building components and systems. The BDA is built around an object-oriented representation of the building and its context, which is mapped onto the corresponding representations of multiple tools and databases. It then acts as a *data manager* and *process controller*, automatically preparing input to simulation tools and integrating their output in ways that support multi-criterion decision-making. Version 3.0 of the BDA is now available for Beta testing and includes links to three main simulation tools for daylighting, electric lighting and energy analyses:

- **DCM**, a simplified daylighting simulation tool,
- **ECM**, a simplified electric lighting simulation tool, and
- the **DOE-2.1E** building energy simulation program.

ECM, the **new electric lighting simulation tool** in BDA 3.0 beta, is integrated through BDA with DOE-2. BDA's Schematic Graphic Editor allows placement of electric lighting luminaires and specification of reference points for daylight-based electric lighting controls. Moreover, BDA now has the capability of **running DOE-2 parametrically** to generate a plot that shows the relationship between effective aperture and energy requirements. BDA 3.0 beta provides the added functionality of working with either **English units or Metric units**.

Current research and development efforts are focused on the development of links to **Desktop Radiance**, a Windows 95/98/NT version of the **Radiance** lighting/daylighting simulation and rendering software.

The minimum and recommended system **requirements** to run the BDA software are as follows:

Minimum	Recommended
Pentium 75	Pentium 200 or better.
Windows 95, 98, NT 4.0.	Windows 95, 98, NT 4.0.
16 / 32MB RAM under Windows 95	24 / 64MB RAM under Windows NT 4.0.
30 MB of larger hard disk space.	60 MB of larger hard disk space.
640x480 or higher screen resolution.	1024x768 or higher screen resolution.

The BDA source code is available for licensing; if interested, please contact Dr. Papamichael at K_Papamichael@lbl.gov.
To learn more about the BDA software and to download a copy of the latest public version (BDA 2.0), please visit
http://gaia.lbl.gov/BDA

For Beta Testing of BDA 3.0, please contact Vineeta Pal at VPal@lbl.gov.
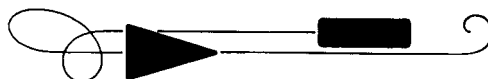
Software Available from Lawrence Berkeley National Laboratory

Free Downloads	
BDA 2.0 (Building Design Advisor) *beta version of 3.0 is available; contact Vpal@lbl.gov*	gaia.lbl.gov/BDA
COMIS (multi-zone air flow and contaminant transport model)	www-epb.lbl.gov/comis
EnergyPlus 1.0 (new-generation whole-building energy analysis program, based on BLAST and DOE-2)	SimulationResearch.lbl.gov > EnergyPlus
GenOpt®1.1 (generic optimization program)	SimulationResearch.lbl.gov > GenOpt
RADIANCE (analysis and visualization of lighting in design)	radsite.lbl.gov/radiance/
Desktop Radiance (integrates the Radiance Synthetic Imaging System with AutoCAD Release 14)	radsite.lbl.gov/deskrad/
RESEM (Retrofit Energy Savings Estimation Model) (calculates long-term energy savings directly from actual utility data)	eetd.lbl.gov/btp/resem.htm
SUPERLITE (calculates illuminance distribution for room geometries)	eetd.lbl.gov/btp/superlite20.html
THERM 2.1a (model two-dimensional heat-transfer effects in building components where thermal bridges are of concern)	windows.lbl.gov/software/therm/therm.html
WINDOW 5 Beta (thermal analysis of window products)	windows.lbl.gov/software/window/ window.html

Request by Fax from 510.486.4089	
RESFEN 3.1 (choose energy-efficient, cost-effective windows for a given residential application)	windows.lbl.gov/software/resfen/resfen.html

Web Based	
Home Energy Saver (quickly compute home energy use)	hes.lbl.gov

Purchase	
VisualSPARK (Simulation Problem Analysis and Research Kernel) (build simulations of innovative building envelope and HVAC systems by connecting component models)	For Windows, SUN, Linux, go to SimulationResearch.lbl.gov > SPARK
ADELINE 2.0 (daylighting performance in complex spaces)	radsite.lbl.gov/adeline/

BLAST*news*

www.bso.uiuc.edu

Building Systems Laboratory (BSL)
30 Mechanical Engineering Building
University of Illinois
1206 West Green Street
Urbana, IL 61801
Telephone: (217) 333-3977
Fax: (217) 244-6534
support@blast.bso.uiuc.edu

The **Building Loads Analysis and System Thermodynamics (BLAST** program predicts energy consumption, energy system performance and cost for new or existing (pre-retrofit) buildings.

BLAST contains three major sub-programs:

- **Space Load Prediction** computes hourly space loads in a building based on weather data and user inputs detailing the building construction and operation.

- **Air Distribution System Simulation** uses the computed space loads, weather data, and user inputs.

- **Central Plant Simulation** computes monthly and annual fuel and electrical power consumption.

Heat Balance Loads Calculator (HBLC)
The BLAST graphical interface (HBLC) is a Windows-based interactive program for producing BLAST input files. You can download a demo version of HBLC (for MS Windows) from the BLAST web site (User manual included).

HBLC/BLAST Training Courses
Experience with the HBLC and the BLAST family of programs has shown that new users can benefit from a session of structured training with the software. The Building Systems Laboratory offers such training courses on an as needed basis typically at our offices in Urbana, Illinois.

WINLCCID 98
LCCID (Life Cycle Cost in Design) was developed to perform Life Cycle Cost Analyses (LCCA) for the Department of Defense and their contractors.

To order BLAST-related products, contact the Building Systems Laboratory at the address above.		
Program Name	**Order Number**	**Price**
PC BLAST Includes: BLAST, HBLC, BTEXT, WIFE, CHILLER, Report Writer, Report Writer File Generator, Comfort Report program, Weather File Reporting Program, Control Profile Macros for Lotus or Symphony, and the Design Week Program. The package is on a single CD-ROM and includes soft copies of the BLAST Manual, 65 technical articles and theses related to BLAST, nearly 400 processed weather files with a browsing engine, and complete source code for BLAST, HBLC, etc. Requires an IBM PC 486/Pentium II or compatible running MS Windows 95/98/NT.	3B486E3-0898	$1500
PC BLAST Package Upgrade from level 295+	4B486E3-0898	$450
WINLCCID 98: executable version for 386/486/Pentium	3LCC3-0898	$295
WINLCCID 98: update from WINLCCID 97	4LCC3-0898	$195
The last four digits of the catalog number indicate the month and year the item was released or published. This will enable you to see if you have the most recent version. All software will be shipped on 3.5" high density floppy disks unless noted otherwise.		

Pacific Gas and Electric Company™

PG&E

WE DELIVER ENERGY.℠

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To register call 415.973.7268 or go to www.pge.com/pec

H V A C

September 26 (Wed) 9:00 am to 4:30 pm	**Chilled Water Plant Design for Optimal Performance** Methods for analysis and life-cycle, cost-optimized design of chilled water plants.
October 3 (Wed) 9:00 am to 4:30 pm	**Operable Windows in Non-Residential Buildings** Discussion of the complexity of incorporating operable windows in non-residential projects.
October 9 (Tue) 9:00 am to 4:30 pm	**Evaporative Cooling Design** Design of direct and indirect evaporative cooling systems and evaporative pre-cooling for air-cooled condensers.

A R C H I T E C T U R E

September 5 (Wed) 9:00 am to 4:30 pm	**Integrated Building Design** Discover how design decisions related to external shading, building envelope, glazing, HVAC systems, electric lighting and daylighting can be integrated to create comfortable and energy-efficient indoor environments.
September 18 (Tue) 3:00 pm to 6:00 pm	**Daylighting Fundamentals** Fundamental principles of daylighting design to achieve high-quality lighting and energy savings.
September 25 (Tue) 9:00 am to 1:00 pm	**Residential Indoor Air Quality** An explanation of how residential air quality is affected by construction materials, moisture, furnishings, ventilation, human activities and construction methods.
October 2 (Tue) 9:00 am to 3:00 pm	**Title 24 Update: Changes in Standards for Building Energy Performance** A review of the changes to the Title 24 Energy Standards (State of California).
October 16 (Tue) 9:00 am to 4:30 pm	**Energy Efficiency and the Building Shell** The energy impact of building envelope design as it pertains to insulation, infiltration, glazing selection, operable windows and daylighting.

W H O L E - B U I L D I N G   P E R F O R M A N C E

September 13 (Thu) 9:00 am to 4:30 pm	**Data Collection for Power and Energy** Assess building electrical loads with simple measurement tools and software programs.
September 19 (Wed) 9:00 am to 12:00 pm	**Introduction to Building Commissioning** Building commissioning can reduce facility energy use.

L I G H T I N G

September 27 (Thu) 9:00 am to 4:30 pm	**Lighting Fundamentals** Basic concepts, terminology, light and color theory, electric light sources, luminaire

design, controls, calculations and economics using the PEC's lighting classroom.

October 25 (Thu)   **Lighting Design for Architects**
6:00 pm to 9:00 pm   Fundamental lighting concepts for architects.

Meetings, Conferences, Symposia

2001

September 15–18 2001	CLIMA 2001		Contact the secretariat at Tel: +39.02.55.193.446 Email: clima@clima2000.it, http://www.clima2000.it
November 5–7 2001	**Second International Conference On Energy Research & Development**		To be held in Safat, Kuwait http://kuc01.kuniv.edu.kw/~icerd
December 2–7 2001	**Performance of the Exterior Envelopes of Whole Buildings VIII: Integration of the Building Envelope**		To be held in Clearwater, FL http://www.ornl.gov/ORNL/BTC/tectrans.htm

2002

January 12–16 2002	**ASHRAE Winter Meeting**		To be held in Atlantic City, NJ Contact: jyoung@ashrae.org http://www.ashrae.org
April 14–18 2002	**LIGHT + BUILDING International Trade Fair**		To be held in Frankfurt, Germany Contact Ina Wiesberger at Tel: +49.69.7575.6144 or email ina.wiesberger@messefrankfurt.com
June 22–26 2002	**ASHRAE Annual Meeting**		To be held in Honolulu, Hawaii Contact: jyoung@ashrae.org http://www.ashrae.org

2002   (continued)

| December 4-6 2002 | Advances in Building Technology | | To be held in Hong Kong – Contact: clyystui@polyu.edu.hk
http://www.polyu.edu.hk/~fclu/ABT21002
Tel: (852) 2766-5033
Fax: (852) 2362-2574 | |

2003

| January 25-29 2003 | ASHRAE Winter Meeting | | To be held in Chicago, IL
Contact: jyoung@ashrae.org
http://www.ashrae.org | |
| June 28-July 2 2003 | ASHRAE Annual Meeting | | To be held in Kansas City, MO
Contact: jyoung@ashrae.org
http://www.ashrae.org | |

On May 30, 2001, the California Energy Commission approved EnergyPro 3.1 as an alternative calculation method computer program for use in demonstrating compliance with the 2001 building energy standards. EnergyPro 3.1 calculates the energy consumption of a building for space heating, space cooling and domestic hot water heating, automatically comparing the energy consumption of the building design against standards requirements.

For EnergyPro 3.1 contact
Gabel Dodd/EnergySoft, LLC
100 Galli Drive, Suite 1
Novato, CA 94949

Tel (415) 883-5900
Fax (415) 883-5970
http://www.energysoft.com/

ENERGYSOFT

DOE-2 Directory of Program Related Software and Services[1]

ESTSC Versions of DOE-2

Program Name	Description		Cost

DOE-2.1E   (Ed Kidd or Walt Kelly)
        estsc@adonis.osti.gov
Energy Science & Technology Software Center (ESTSC)
P.O. Box 1020
Oak Ridge, TN 37831-1020
Ph: 865-576-2606 / Fx: 576-2865
www.doe.gov/html/osti
	Source code, executable code and complete current documentation for:
	
	DOE-2.1E/Version 110 for Windows and SUN UNIX
	DOE-2.1E DEC-VAX
	
	Operating System: Windows, SUN UNIX, DEC-VAX
		<u>Support</u>
		From ESTSC, limited operational support (telephone assistance concerning installation, media or platform questions).
			Windows SUN-UNIX VAX
			Govt/Educ $ 300 $455 $500
			
			US, Mexico, Canada
			        $575 $1365 $1835
			Other Foreign
			        $1075 $2120 $2716

Commercial Versions of DOE-2

Program Name	Description		Cost
ADM-DOE-2 (Richard Burkhart) ADM Associates adm_asc@ns.net 3239 Ramos Circle Sacramento, CA 95827-2501 Ph: 916-363-8383, Fx: 363-1788	Use on 386/486 PCs with a math co-processor and 4MB of RAM. The package contains everything needed to run the program: program files, utilities, sample input files, and weather files. More than 300 weather files available. **Operating System**: DOS, Windows 95	<u>Input</u> <u>Output</u> <u>Support</u>	$395 + $15/SH including one set weather data (your choice) and documentation
Compare-IT (Matt Brost) RLW Analytics, Inc. info@rlw.com 1055 Broadway, Suite G Sonoma, CA 95476 Ph: 707-939-8823, Fx: 939-9218 www.rlw.com	Compare-IT allows DOE-2 professionals to add value to their projects by giving clients "what-if" scenarios using DOE-2. The interface is designed for novice energy analysts and the GUI can be customized for each client's particular interests. Based DOE-2.1E. **Operating System:** DOS, Windows (98, 95, NT)	<u>Input</u>: Customizable windows GUI dynamically built based on DOE-2 macros. <u>Output</u> <u>Support</u>	$500 consultant $2000 client Documentation available
DOE-Plus (Steve Byrne) Item Systems byrne @ item.com 321 High School Road NE #344 Bainbridge Island, WA 98110 Ph: 206-855-9540 / Fx: 855-9541 www.halcyon.com/byrne	Complete support for all DOE-2 commands. Utility programs included: Prep, Demand Analyzer, weather processor. Over 500 worldwide weather files. Imports BDL files created with a text editor or other program. Based DOE-2.1E. **Operating System**: DOS, Windows (3.1, 95, NT)	<u>Input</u> Interactive, graphical, fill-in-the-blanks <u>Output</u> Customizable tables and graphics <u>Support</u> Unlimited, except modeling advice. On-line help.	$895 with DOE-2 and doc $495 without DOE-2 Source code not available.

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[1]   We list third-party DOE-2-related products and services for the convenience of program users, with the understanding that the Simulation Research Group does not have the resources to check the DOE-2 program adaptations and utilities for accuracy or reliability.

Commercial Versions of DOE-2 (continued)

Program Name	Description		Cost
EnergyPro 3.0 (D. Vonderkulen) demian@energysoft.com Gabel Dodd/EnergySoft LLC 100 Galli Drive #1 Novato, CA 94949-5657 Ph: 415-883-5900, Fx: 883-5970 www.energypro.com	Performs nonresidential load calculations for HVAC equipment sizing. Electronically exports forms to AutoCad for inclusion on blueprints. On-line help. 344 weather files for the U.S. and Canada. **Operating System:** DOS, Windows (95, NT). <u>***For California Users***</u>: Performs Title 24 compliance calculations, includes state-certified HVAC and DHW Equipment directories, Title 24 tailored lighting calculations. Based on ESTSC DOE-2.1E	<u>Input:</u> Graphical <u>Output:</u> Graphs, forms <u>Support</u> Unlimited support	DOE-2 Module: Non-residential $ 700[1,2] Residential $ 250[1,2] Program Interface $ 195[3] [1] price reflects cash discount [2] includes documentation [3] required
EZDOE (Bill Smith) bsmith @ elitesoft.com Elite Software P.O. Box 1194 Bryan, TX 77806 Ph: 409-846-2340 / Fx: 846-4367 www.elitesoft.com	Provides full screen, fill-in-the-blank data entry, dynamic error checking, context-sensitive help, mouse support, graphic reports, a 750-page user manual, and extensive weather data. Full implementation of DOE-2 on DOS-based 386 and higher computers. On-line help. Some weather files. Based on DOE-2.1E. **Operating System**: DOS	<u>Input</u> Fill-in-the-blanks <u>Output</u> Standard DOE reports plus some custom graphic reports <u>Support</u> Unlimited phone support	$1295 w/documentation Source code not available.
FTI/DOE2 (Scott Henderson) info @ finite-tech.com Finite Technologies Inc. 3763 Image Drive Anchorage, Alaska 99504 Ph: 907-333-8937, Fx: 333-4482 www.finite-tech.com	Version 3.0 Release -- FTI/DOE is 100% compatible with LBNL version. Source code versions will compile with most F77-compliant compilers. On-line help: 344 weather files for the U.S. and Canada. Based on ESTSC DOE-2.1E. No demo, 30-day trial period **Operating System**: DOS, Windows (3.x, 95, NT) AIX, ULTRIX, VMS, Linux, NeXTStep,	<u>Input</u> Version 2.x: text based Version 3.x: graphical <u>Output</u> All standard DOE-2 reports Run time and status graphics <u>Support</u> 90-days free; then cost is $ 35 each email per incident $ 55 per hour per incident $125 per hour for engineering advice.	$ 995.99 US w/documentation $1066 Int'l w/documentation $4999.99 Source code
PRC-DOE-2 (Paul Reeves) Paul.Reeves@DOE2.com Partnership for Resource Conservation 140 South 34th Street Boulder, CO 80303 Ph: 303-499-8611, Fx: 554-1370	Text-based version of DOE-2 includes documentation. Extensive information on new features, including information on new system types, new commands, new options, etc., added to later versions of 2.1E. **Operating System**: DOS, Windows (95, NT)	<u>Input</u> Standard text-based <u>Output</u> <u>Support</u> Unlimited support.	$ 495 w/documentation Source code not available.

Hear with your ears, but listen with your heart.

Commercial Versions of DOE-2 (continued)

Program Name	Description		Cost
VisualDOE 3.0 (Eric Kolderup) support@eley.com Charles Eley Associates 142 Minna Street San Francisco, CA 94105 Ph: 415-957-1977 Fx: 415-957-1381 www.eley.com	Fast construction of building geometry using pre-defined blocks and/or drawing interface. Import zone shapes from CADD file (dxf format). Point-and-click to define zone properties and HVAC systems. Rotate-able 3-D image of model. Custom hourly outputs, customized graphs. On-line help. 400+ US weather files, 12+ for Canada, plus selected locations around the world. **Operating System**: DOS, Windows (3.1, 95, NT)	<u>Input</u> Graphical <u>Output</u> Graphical <u>Support</u> 90 days free phone and email support.; thereafter $195/hear	Version 2.61 is $495; contact Eley Associates for the price of Version 3.0 (includes documentation) Source code not available.

Pre- and Post Processors for DOE-2

Program Name	Description	Cost
DrawBDL Joe Huang & Associates 6720 Potrero Avenue El Cerrito, CA 94530 Ph/Fx: 510-236-9238	**DrawBDL,** Version 2.1, is a **graphic debugging and drawing tool for DOE-2 building geometry**. DrawBDL reads your BDL input and makes a rotate-able 3-D drawing of your building with walls, windows, and building shades shown in different colors for easy identification. **Operating System**: DOS, Windows (3.1, 95, 98, NT) [Works with 2.1E]	$125.00 plus shipping
PRC-TOOLS (Paul Reeves) **P R C** 140 South 34th Street Boulder, CO 80303 Ph: 303-499-8611 / Fx: 554-1370	*PRC-Tools* aid in **extracting, analyzing, and formatting DOE-2 output**. *PRC-Grab* automates the process of extracting any number of answers from DOE-2 standard output files. *PRC-Hour* and *PRC-Peak* format the hourly output and create Peak-Day and Average-Day load shapes for any number of periods and for any combination of hourly values. **Operating System**: Windows (95, 98, NT) [Works with 2.1E]	$99.00
Visualize-IT (Matt Brost) **RLW Analytics, Inc.** mattb@rlw.com 1055 Broadway, Suite G Sonoma, CA 95476 Ph: 800-472-6716 Fx: 707-939-8823 www.rlw.com	Visualize-IT 2.0 is a Windows application designed to help you explore and summarize short-interval time series data, e.g., measurements taken once every 15 minutes over a period of weeks, months or years. Visualize-IT has been developed specifically for electric and gas load data measuring class profiles, market-segments, individual customer sites or specific end uses. Customized DOE2.1e hourly output importer. Visualize-IT is highly useful and informative for looking at DOE2 output and/or comparing to interval metered data. It is equally useful for other time series measurements such as weather, industrial process control, and water quality. **Operating System:** Windows 95, 98 and NT	$500.00 per set Volume Discounts Available

Genius does what it must and talent does what it can.

Special Versions of DOE-2

Program Name	Description	Cost
CBIP pebc.rncan.gc.ca/cbip.htm Office of Energy Efficiency Natural Resources Canada 580 Booth St., 18th Floor Ottawa ON K1A 0E4, CANADA	Natural Resources Canada's **Commercial Building Incentive Program (CBIP)** offers a financial incentive for the incorporation of energy efficiency features in new commercial and institutional building designs. The objective of this new incentive is to encourage energy-efficient design practices and to bring about lasting changes in the Canadian building design and construction industry. The program will be offered until March 31, 2004.	Web Based
Cool Tools (Peter Turnbull) Pacific Gas & Electric Company pwt1@pge.com www.hvacexchange.com/cooltools/	The CoolTools™ project objective is to develop, disseminate and promote an integrated set of tools for design and operation of chilled water plants. CoolTools products are Internet based, public domain resources available to building owners, design professionals, and operators involved in both new construction and retrofits.	Web Based
DesiCalc GRI-98/0127 www.desicalc.com	**DesiCalc screens desiccant cooling applications**. It estimates annual or monthly energy loads, using hour-by-hour simulations, and costs for 11 typical commercial buildings in 236 geographical locations in the US. Includes the latest TMY2 meteorological database [Based on DOE-2.1E] **Operating System:** Windows 3.1, 95, 98, NT	$295 w/doc +8.75% tax in IL +4.5% tax in VA S/H add $20
Energy Gauge USA (Danny Parker) Florida Solar Energy Center 1679 Clearlake Road Cocoa, FL 32922 Ph: 407-638-1405, Fx: 407-638-1439	*Energy Gauge USA* allows the simple **calculation and rating of residential building energy use** in the US. The simulation calculates a six-zone model of the residence (conditioned zone, attic, crawlspace, basement, garage and sunspace) with the various buffered spaces linked to the interior as appropriate. TMY weather data for the program are available for 239 US locations. [Based on DOE-2.1E] **Operating System:** Windows 95, 98, NT	Contact Danny Parker at FSEC for availability.
Home Energy Saver (Residential DOE-2) http://hes.lbl.gov	**Calculation of residential energy consumption using DOE-2.1E**. The program performs a full annual simulation for a typical weather year (involving 8760 hourly calculations) from 239 locations around the United States in about 10-20 seconds.	Web Based
PERFORM 2001 California Energy Commission 1516-9th St., MS-13 Sacramento, CA 95814 Ph: 916-654-5385	Created for the State of **California** Energy Commission's, **Title 24 energy code**. Perform 2001 is an interface shell with DOE-2 as the engine. PERFORM 2001 calculates building energy consumption for space heating, space cooling and domestic hot water heating, and compares the energy consumption of the building design against the requirements of the standards. DOS input. Output is only California Title 24 compliant. [Based on DOE-2.1E] Technical support $100/year from Gabel-Dodd Energy Soft LLC, Call 415-883-5900 for details.	$250 including PERFORM 2001 program and manual on CD. (VISA/MC) Order #PS-400-04-017
RESFEN-3.1 Building Technologies, MS 90-3111 Lawrence Berkeley Laboratory Berkeley, CA 94720	**RESFEN** calculates the **energy and cost implications of a building's windows compared to insulated walls**. The relative energy and cost impacts of two different windows can also be compared against each other. RESFEN calculates the heating and cooling energy use and associated costs, also the peak heating and cooling demand for specific window products. [Based on DOE-2.1E] **Operating System:** Windows 95, 98, NT	Free! Download from http://windows.lbl.gov/… …software/resfen

INTERNATIONAL DOE-2 RESOURCE CENTERS

The people listed here have agreed to be primary contacts for DOE-2 program users in their respective countries. Each resource center has the latest program documentation, all back issues of the User News, and recent LBNL reports pertaining to DOE-2. Users may make arrangements to photocopy the new material for a nominal cost. We hope to establish centers in other countries; please contact us if you want to establish a center in your area.

Australasia

P. C. Thomas, SOLARCH, University of New South Wales, Sydney 2052, Australia
Tel: +61 2 9385 6373 / Fax: +61 2 9385 6735, email PC.Thomas@unsw.EDU.AU www.fbe.unsw.edu.au/units/solarch

Australia

Murray Mason, ACADS BSG, 16 High Street, Glen Iris, VIC. 3146, Australia   /   Tel: +61 885 6586 / Fax: +61 885 5974

Brazil

Prof. Roberto Lamberts, Universidade Federal de Santa Catarina, Campus Universitario-Trindade, Cx. Postal 476, 88049-900 Florianopolis SC, BRASIL
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Tel: +49 2 131 7574 9012 G. Morgenstern / Fax: +49 2 131 7574 9029

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Dr. Sam C. M. HUI or K.P. Cheung, Dept of Architecture, University of Hong Kong, Pokfulam Road, Hong Kong (SAR), CHINA / cmhui@hku.hk or kpcheung@hku.hk / http://arch.hku.hk/research/BEER/DOE-2/DOE-2.htm
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Korea (Taejon)

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INTERNATIONAL DOE-2 RESOURCE CENTERS (continued)

New Zealand

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rego.teixeira@mail.ineti.pt / Tel: +351 21 716 5141 x2669 / Fax: +351 21 716 4305

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Dejan Radoicic, D. W. Thomson Consultants, Ltd., 1985 West Broadway #200, Vancouver, BC V6J 4Y3, Canada Tel (604) 731-4921 / Fax (604) 738-4420

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Dr. Stephane Bilodeau, PE, President, Groupe Enerstat, Inc., 79 Wellington North #202, Sherbrooke (Quebec) J1H 5A9, Canada
sbilodeau@groupeenerstat.com / Tel: (819) 562-8040 / Fax (819) 562-5578

Gordon Shymko, G.F. Shymko & Associates, Inc., 129 Evergreen Crescent S.W., Calgary, Alberta T2Y 3R2, Canada

Germany

Jens Grundt and Ludwig Michel, GMW-Ingenieurburo, Die Planer Villa, Bünteweg 10a, 30559 Hannover, Lower Saxony, Germany
Tel: +49 0511 58 59 48 -11/Fax +49 0511 58 59 48 -48 www.gmw-ingenieurbuero.de j.grundt@gmw-ingenieurbuero.de

I N T E R N A T I O N A L   DOE-2   E N E R G Y   C O N S U L T A N T S (continued)

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Tel: +41 349 3349, Fax: 349 3960

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United Kingdom

Dr. Peter Simmonds, Ove Arup and Partners, Ltd., 13 Fitzroy Street, London W1P 6BQ, UNITED KINGDOM.
Tel: +44 20-7465-3637 / Fax: 7465-3667, peter.simmonds@arup.com / www.arup.com

U. S.   D O E - 2   E N E R G Y   C O N S U L T A N T S

Arizona

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Henny van Lambalgen, P.E. henny@questenergy.com	Quest Energy Group, LLC www.questenergy.com	4324 East Pearce Road	Phoenix, AZ 85044	(480) 753-5590 fax 753-1215
Marlin S. Addison marlin.addison@doe2.com	M. S. Addison & Associates	1215 West 12th Place	Tempe, AZ 85281	(480) 968-2040 fax: 968-2053
Chuck Sherman ces@essinc.com	ESSengineering	2141 East Broadway, #211	Tempe, AZ 85282	(480) 784-4500 fax: 784-4800
Sarat Kanaka nexus@nexusenergy.com	EcoGroup, Inc., Suite 301	2085 E. Technology Circle	Tempe, AZ 85284	(602) 777-3000

California

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George Marton	1129 Keith Avenue		Berkeley, CA 94708	(510) 841-8083
John R. Aulbach, PE jrascab36@earthlink.net	23508 Naffa Avenue		Carson, CA 90745	(310) 549-7118
Leo Rainer lirainer@davisenergy.com	Davis Energy Group, Inc. www.davisenergy.com	123 C Street	Davis, CA 95616	(916) 753-1100
L. Heshong and D. Mahone lheshong@h-m-g.com dmahone@h-m-g.com	The Heshong Mahone Group www.h-m-g.com	11626 Fair Oaks Blvd., #302	Fair Oaks, CA 95628	(916) 962-7001 fax: 962-0101
Cliff Gustafson	Taylor Systems Engineering. Inc. www.tse-inc.net	9801 Fair Oaks Blvd., #100	Fair Oaks, CA 95628	(916) 961-3400 fax: 961-3410
Tom Lunneberg, PE info@ctg-net.com	Constructive Tech. Group www.ctg-net.com/main.htm	16 Technology Dr., #109	Irvine, CA 92618	(714) 790-0010
David J. Schwed rma@as.net	Romero Management Associates www.asnet/~rma/index.htm	1805 West Avenue K	Lancaster, CA 93534	(805) 940-0540
Martyn C. Dodd support@energysoft.com	Gabel Dodd/EnergySoft, LLC www.energysoft.com	100 Galli Drive, # 1	Novato, CA 94949	(415) 883-5900 fax: 883-5970
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