A SAS BASED SYSTEM FOR UTILITY RATE ANALYSIS
Eugene Y. Ho, Southern California Edison Company

ABSTRACT
The SAS system has experienced phenomenal growth in application since its introduction. The power and versatility of SAS macro facility allows user to develop and build flexible as well as user-friendly softwares.

This paper describes a SAS-based system used at the Revenue Requirements department of Southern California Edison Company for rate analysis. The system is menu-driven to allow rate design analysts to perform 'what if' type analyses due to changes in rate components, to perform customer impact studies in different climatic regions, and to make recommendations on implementing new baseline rates.

Furthermore the system is designed for use and maintenance by non-programmer.

INTRODUCTION
In 1982 the California Public Utilities Commission directed all investor-owned electric and gas utilities to change their residential rate structure from lifetime to a new system called baseline. The legislation's goals were to simplify residential rates by making them easier for customers to understand and more practical for utilities to administer, to encourage conservation of energy, and to provide energy at a fair cost to residential customers. Southern California Edison Company was required to implement baseline rates effective May 1, 1985.

An automated system, as described below, was thus created to perform extensive analyses and customer impact studies.

SYSTEM OVERVIEW
The system runs under the TSO environment. It consists of a CLIST and a SAS program. User may invoke SAS interactively through the CLIST.

The CLIST allocates resources for SAS execution, invokes SAS with the INSTSMT option and controls report output upon termination of the program.

The program is written in modules. Each module is built by SAS macro(s) to perform an individual task. They link together to form a program under the control of driver module. This modular technique is the foundation of structural SAS programming.

PROGRAM
Macro CONTROL is invoked by the CLIST. It controls execution of the program. First it displays the system entry screen via DISPLAYI, then calls INPVAL, which in turn displays the user main menu and validates user's input. (Figure 1)

Macro MAINMENU is called by INPVAL. It offers the user a series of options. (Figure 2)

Macro INPVAL validates a selected option supplied by the user. Once a valid option is entered, macro variable MCHOICE is created to pass to other data steps via ACTION. Macro ACTION is conditionally executed based on the user's selection. (Figure 3)

Macro GUIDE invokes PROC FSBROWSE. It provides user with instructions on how to use the system. Upon termination of this procedure, program control will return to the driver macro CONTROL. (Figure 4)

Macro SETRATE allows user to edit rate components including minimum, base and offsets charges. Each component is broken down into baseline and non-baseline portions. These data are captured by PROC FSEDIT. (Figure 5)

Macro SETALLO is for user to edit baseline allowance, climatic region and appliance indicator through PROC FSEDIT. Each observation represents one scenario on the rate comparison analysis. (Figure 6)

Macro RUNREP performs rate calculations and produces reports for analysis. It consists of three subroutines. Macro CREPORT produces control reports for user validation of input data. Macro CALC compiles data and performs calculations. Macro REPORT produces report for baseline analysis. These reports will be temporarily stored in a TSO dataset and will not be printed unless a print option is selected later in the CLIST. (Figure 7a, 7b, 7c)

Macro QUITT terminates SAS gracefully with an exit display screen via DISPLAYQ. It returns user to the CLIST. User can then select output for the reports. (Figure 8)
SUMMARY

The system described above has illustrated an application of the powerful SAS macros. The structural macro-based systems are easily maintainable and give an added dimension of flexibility to the system developer.

For further information, the author can be contacted by writing to the following address:

Southern California Edison Company
Revenue Requirement Department
2244 Walnut Grove Avenue
Rosemead, California 91770

(818) 302-6869

SAS and SAS/FSP are registered trademarks of SAS Institute Inc., Cary, North Carolina

FIGURE 1.

PROGRAM EXECUTION STARTS. MACRO CONTROL IS INVOKED BY THE Client.
The macro controls the execution of the program. It first displays the system entry screen, then calls the macro INPVAL, which displays the user main menu and validates user's input options.

FIGURE 2.

MACRO VALMENU OFFERS THE USER A SERIES OF OPTIONS. VALMENU IS CALLED BY THE MACRO INPVAL.

MACRO INPVAL VALMENUS OBTAINS A SELECTED OPTION SUPPLIED BY THE USER CORRESPONDING TO AN OPTION NUMBER OF THE MAIN MENU SCREEN. ONCE AN ACCEPTABLE OPTION IS ENTERED, MACRO VARIABLE CHOICE IS CREATED TO PASS TO OTHER DATA STEP VIA MACRO ACTION.

MACRO ACTION IS CONDITIONALLY EXECUTED BASED ON THE USER'S SELECTION.
FIGURE 4

MACRO GUIDE IS SIMPLE TUTORIAL SCREENS FOR THE USERS.

%MACRO GUIDE;
PROC PUSHTLIE DATA=ZL.USER OPTION=1 SCREEN=ZI.USERSCR;
RUN;
%MEND GUIDE;

BASELINE ANALYSIS USER GUIDE

THE BASELINE ANALYSIS SYSTEM IS A SAS BASED COMPUTER SYSTEM. IT IS DESIGNED TO USE IN ANALYSIS COMPONENTS WHICH IMPACT THE IMPLEMENTATION OF BASELINE ALLOWANCES.

FIGURE 5

MACRO SETRAN ALLO ALLWS USERS TO EDIT RATE COMPONENTS.

%MACRO SETRAN;
PROC PUSHTLIE DATA=ZL.RAIE OPTION=1 SCREEN=ZI.RATESCR;
RUN;
%MEND SETRAN;

BASELINE ANALYSIS SYSTEM RATE COMPONENTS

TABLE: PRESENT PROPOSED

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRESENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE01</td>
<td>2.00000</td>
<td>2.00000</td>
</tr>
<tr>
<td>BASE02</td>
<td>0.04567</td>
<td>0.04567</td>
</tr>
<tr>
<td>BASE03</td>
<td>0.06000</td>
<td>0.06000</td>
</tr>
<tr>
<td>AE01</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>AE02</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>AE03</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
</tbody>
</table>

RUN

FIGURE 6

MACRO SETALLO ALLOWS USERS TO ESTABLISH SCENARIOS FOR BASELINE ANALYSIS WITH COMBINATIONS OF BASELINE ALLOWANCES, CLIMATIC ZONES AND ENDUSE INDICATORS.

%MACRO SETALLO;
PROC PUSHTLIE DATA=ZL.ALLO OPTION=1 SCREEN=ZI.ALLOSE;
RUN;
%MEND SETALLO;

BASELINE ANALYSIS SYSTEM BASELINE ALLOCATION

RATE COMPONENT: BASELINE ALLOCATION

RUN

FIGURE 7A

MACRO RUNREP PERFORMS CALCULATIONS AND PRODUCES REPORTS FOR THE ANALYSIS.

%MACRO RUNREP;
OPTIONS CENTER LS=120 PD=60;
REPORT;
DATA;
SCALE;
REPT;
EMPL;
DEAD RUNREP;

BASELINE ANALYSIS SYSTEM

BASELINE CALCULATES MONTHLY BILL FOR EACH SCENARIO.

%MACRO BASE;
BASE FINAL:
WAGE ZZ.RATE ZZ.ALLO;
BY RATE;
DO ITEM = 0, 100, 200 TO 2000;
BASE = MAX X item, item-BASE02*(BASE01-0.0)+BASE02, BASE01;
OFFSET = BASE-001-BASE02+BASE02+BASE03+BASE04+BASE05+BASE06;
TOTAL = BASE+OFFSET;
PRINT BASE, OFFSET, TOTAL;
END;
%MEND BASE;

BASELINE ANALYSIS SYSTEM BASELINE ALLOCATION

EVENT: PRESENT PROPOSED

<table>
<thead>
<tr>
<th>ITEM</th>
<th>PRESENT</th>
<th>PROPOSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>BASE01</td>
<td>2.00000</td>
<td>2.00000</td>
</tr>
<tr>
<td>BASE02</td>
<td>0.04567</td>
<td>0.04567</td>
</tr>
<tr>
<td>BASE03</td>
<td>0.06000</td>
<td>0.06000</td>
</tr>
<tr>
<td>AE01</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>AE02</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
<tr>
<td>AE03</td>
<td>0.00000</td>
<td>0.00000</td>
</tr>
</tbody>
</table>

RUN

FIGURE 7B

MACRO CALC Calculates MONTHLY BILL FOR EACH SCENARIO.