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**HAWAII DEMAND-SIDE MANAGEMENT
RESOURCE ASSESSMENT**

**FINAL REPORT
REFERENCE VOLUME 4**

**The DBEDT DSM Assessment Model
User's Manual**

Prepared for:

The Department of Business,
Economic Development, and Tourism
State of Hawaii

April 1995

Prepared by:

NEOS Corporation
8950 Cal Center Drive, Suite 255
Sacramento, California 95826
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MASTER

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MEASURE IMPACTS DATABASE

- Single Family Residence
- Multi-Family Unit
- Large Office
- Small Office
- Large Retail
- Small Retail
- Fast Food Restaurant
- Sit Down Restaurant

-PART 2 OF 3-

MEASURE IMPACTS DATABASE (Continued)

- Grocery
- Refrigerated Warehouse
- Non-Refrigerated Warehouse
- Hospital
- School
- College
- Oahu-Hotel
- Maui-Hotel

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Oahu-Resort
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THE DBEDT DSM ASSESSMENT MODEL

USER'S GUIDE

1.0 INTRODUCTION

The DBEDT DSM Assessment Model (DSAM) is a spreadsheet model developed in Quattro Pro for Windows that is based on the integration of the DBEDT energy forecasting model, ENERGY 2020, with the output from the building energy use simulation model, DOE-2. DOE-2 provides DSM impact estimates for both energy and peak demand. The "User's Guide" is designed to assist DBEDT staff in the operation of DSAM. Supporting information on model structure and data inputs are provided in Volumes 2 and 3 of the Final Report.

DSAM is designed to provide DBEDT estimates of the potential DSM resource for each county in Hawaii by measure, program, sector, year, and levelized cost category. The results are provided for gas and electric and for both energy and peak demand.

There are two main portions of DSAM, the residential sector and the commercial sector. The basic underlying logic for both sectors are the same. However, there are some modeling differences between the two sectors. The differences are primarily the result of 1) the more complex nature of the commercial sector, 2) memory limitations within Quattro Pro, and 3) the fact that the commercial sector portion of the model was written four months after the residential sector portion.

The structure for both sectors essentially consists of a series of input spreadsheets, the portion of the model where the calculations are performed, and a series of output spreadsheets. The output spreadsheets contain both detailed and summary tables and graphs.

The minimum PC requirements to effectively run DSAM are a 486 based PC with 16 MB of RAM. Quattro Pro is a RAM intensive software and DSAM reflects this demand for RAM. RAM amounts beyond 16 MB and a Pentium based PC significantly speed-up the processing time for DSAM. The amount of harddisk space required by the model is dependent on whether the user wishes to maintain a series of scenario runs on the harddrive or whether only the basic model and output is

maintained on the system. For the basic model and output, about 30 MB of harddisk space is required. This is beyond the need for the harddisk space required by Quattro Pro.

2.0 INSTALLATION

There is one install disk for the residential sector and four install disks for the commercial sector of DSAM. The installation disks contain install programs that will create the necessary harddisk directories and copy the necessary files for both the residential and commercial sectors.

To install the residential sector software, insert the single residential diskette into the appropriate floppy drive. At the DOS prompt, change disk drives to the drive containing the install diskette (A or B). At the appropriate disk drive prompt, type "Install [Source Drive] [Target Drive]" (example, Install A C). After entering this command, follow the instructions to complete installation.

Installation of the commercial sector software is similar, but involves four disks. Insert Disk 1 into the appropriate floppy drive. At the DOS prompt, change disk drives to the drive containing the install diskette (A or B). At the appropriate disk drive prompt, type "Install [Source Drive] [Target Drive]" (example, Install A C). After entering this command, follow the instructions to complete installation. A difference from the residential installation will be the installation program requesting the installer to switch disks as needed.

Once installation is complete, return to Windows and startup Quattro Pro for Windows. Once into Quattro Pro, the residential portion of DSAM is initialized by retrieving from the HAWRES2 subdirectory the spreadsheet HAW-RES. The commercial portion of DSAM is initialized by retrieving from the HAWCOM subdirectory the spreadsheet COM. If DSAM program icons have been made to start up the programs directly for Windows, then each sector is initiated by double clicking the appropriate icon.

3.0 RESIDENTIAL SECTOR

Figure 3-1 illustrates the flowchart of files used to develop the DBEDT DSM assessment for the residential sector. The top portion of the figure reflect input files, the middle portion the actual DSM model and the bottom portion the output files. Each of these files currently exist and reflect the DOE-2 results and ENERGY 2020 forecast results as of December, 1994. If different ENERGY 2020 forecast results are to be used by DSAM, the appropriate ENERGY 2020 output files (SATUECH.TAB, SATUECK.TAB, SATUECM.TAB, and SATUECO.TAB) must be copied into the HAWRES2 subdirectory.

The residential portion of DSAM is initiated by starting the spreadsheet "HAW-RES" which is identified in the middle portion of Figure 3-1. Figure 3-2 illustrates the opening screen the user encounters when entering the HAW-RES spreadsheet. Three options are provided the user; to input data, to update calculations, or to review model output. The user presses the appropriate button to perform the next desired task.

Figure 3-3 illustrates the screen that appears if the "INPUT" button is pushed. Here, more button options are provided for the user to select from. Selecting the "Current Island" button for a summary of forecast model characteristics takes the user to the portion of the HAW-RES spreadsheet that identifies which island was last accessed by DSAM and the characteristics appropriate for that island. This is not an input area, but rather only an area to browse if the user is curious about which island was last considered by DSAM. Pushing any of the individual island buttons under DSM Program & Utility Inputs takes the user to the "PROGRAM" spreadsheet identified in Figure 3-1 where DSM program characteristics are input.

If the button "Oahu" had been selected, the user would have been taken to the Oahu page of the PROGRAM spreadsheet. This page is illustrated in Figure 3-4. Here, more user options are provided via buttons for cross program, peak information, and program characteristics inputs. Note that there are also buttons for the commercial sector. These are operational, but are not directly linked to the commercial sector portion of DSAM. A modeling consideration at one time was to have both residential and commercial sector sections to input files. However, this concept was abandoned as other input files were created because of the extra memory requirements imposed by keeping both residential and commercial information in the same input files. Changing

FIGURE 3-1

HAWAII DBEDT DSM FORECASTING MODEL FLOWCHART
RESIDENTIAL SECTOR

FIGURE 3-2

Input Data

Update Calculations

Output

FIGURE 3-3

INPUT DATA

DSM Progam & Utility Inputs

- Oahu
- Hawaii
- Maui
- Kauai

Return To Main Menu

Summary Of Forecast Model Characteristic

Current Island

FIGURE 3-4

commercial sector program characteristics must be accomplished through the spreadsheet "COM" as outlined in Section 4.

Selecting the "Cross Program" button takes the user to the input area for Cross Program Data. This input area is illustrated in Figure 3-5. The user may change any of these values by highlighting the existing values and typing in the new values. If the user wants the changes to be the same for all four counties, then each county page within the spreadsheet must be changed. Otherwise, each county can have unique values. The current values provided for the variables in Figure 3-5 are a mix of values obtained from IRP submittals by HECO and GASCO and professional judgement of NEOS staff. The values for marginal fuel and operation cost were obtained from a GASCO IRP filing, the average rate per kWh, the levelized capacity cost, and the average rate per therm were obtained from HECO IRP filings, with the remaining values based on NEOS professional judgement.

Once variable values have been modified or reviewed, the user returns to the Input Menu by selecting the "Return To Input Menu" button as shown in Figure 3-5. This returns the user to the button options shown in Figure 3-4. Selecting the "Peak Information" button takes the user to the input area for Peak Information, as shown in Figure 3-6. As with the Cross Program variables, the values input for Peak Information can vary by county. Within the Peak Information input area, the two variables that are of importance are the identification of the peak month and the peak hour for that peak month. The other values for peak hour are not used by DSAM but could be used in future enhancements to determine monthly peak demand impacts. The source of the peak information for peak month and hour was each of the electric utilities in the state.

Returning again to the Input Menu by selecting the "Return To Input Menu" button as shown in Figure 3-6, the user is returned to the button options shown in Figure 3-4. The final option to select for the residential sector is the button for the "Program Info - Res". Figure 3-7 illustrates the Program Characteristics input area. Again, as with the other input spreadsheet areas, the values for Program Characteristics can vary by county. Within the Program Characteristics area, variables are disaggregated into program categories. The source of the current values for each variable, with the exception of "Measure Life Decay Factor" and "Interaction Rate With Cooling", are from the review of other DSM programs from the mainland United States as outlined in Volume 2 of the Final Report. The "Measure Life Decay Factor" is a value that

FIGURE 3-5

CROSS PROGRAM DATA	
FIRST FORECAST YEAR:	1995
DISCOUNT RATE:	6.0%
TRANSMISSION & DISTRIBUTION ADJUSTMENT:	1.05
MARGINAL FUEL & OPERATION COST (\$/MWH):	\$90.90
AVERAGE RATE PER KWH:	\$0.088
LEVELIZED CAPACITY COST (\$/KW):	\$145.00
PIPELINE LOSS ADJUSTMENT:	1.05
MARGINAL FUEL & OPERATION COST (\$/THERM):	\$1.75
AVERAGE RATE PER THERM:	\$1.59
ECONOMIC SCREENING (Select Only One As "YES"!)	
All Measures Considered; No Screening: NO	
Total Resource Cost Test (TRC): YES	
Ratepayer Impact Measure Test (RIM): NO	
DSM POTENTIAL SCENARIO: 4	
(1=Technical, 2=Economic, 3=Market, 4=Hawaii Program)	

FIGURE 3-6

[Return To Input Menu](#)

Peak Information	
Peak Month (three letter abbreviation): OCT	
Peak Hour By Month (1-24)	
Jan	19
Feb	19
Mar	19
Apr	9
May	9
Jun	9
Jul	9
Aug	9
Sep	9
Oct	19
Nov	19
Dec	19

FIGURE 3-7

PROGRAM CHARACTERISTICS

	Tech & Econ Max Market Penetration	Market Spec Max Market Penetration	Hawaii Spec Max Market Penetration	Net To Gross Ratio	Admin Cost	Measure Life Decay Factor	Renewal Rate	Interaction Rate With Cooling
Room A/C	100%	85%	50%	98%	15%	0.75	50%	na
Central A/C	100%	85%	50%	98%	15%	0.75	50%	na
Refrigeration	100%	85%	50%	98%	15%	0.75	50%	0.069
Lights	100%	75%	40%	83%	8%	0.75	50%	0.08
Water	100%	85%	50%	98%	15%	0.75	50%	na
C-Drying	100%	85%	50%	98%	15%	0.75	50%	0.132
Cooking	100%	85%	50%	98%	15%	0.75	50%	0.117
A/C Controls	100%	85%	70%	100%	15%	1	0%	na
Water Controls	100%	95%	70%	100%	15%	1	0%	na

determines the shape of the measure decay curve. A discussion of this factor is also provided in Volume 2 of the Final Report. The "Interaction Rate With Cooling" value was calculated based on the results from the DOE-2 building energy simulations. The calculation was performed by comparing the DOE-2 predicted DSM impact of a measure implemented in a home with air conditioning against the DOE-2 predicted DSM impact for the same measure implemented in a home without air conditioning. As an example, the interaction value for refrigeration was estimated as follows:

For Single Family - Refrigerator better than 10 percent of federal standards:

- Impact in homes with A/C = 77.58 kWh
- Impact in homes without A/C = 71.99 kWh
- Interaction Rate = $(77.58 - 71.99) / 71.99$
= 0.0776

For Multi-Family - Refrigerator better than 10 percent of federal standards:

- Impact in homes with A/C = 76.43 kWh
- Impact in homes without A/C = 72.03 kWh
- Interaction Rate = $(76.43 - 72.03) / 72.03$
= 0.0611

Average of single family and multi-family = $(0.0776 + 0.0611) / 2$
= 0.0694

Returning again to the Input Menu by selecting the "Return To Input Menu" button as shown in Figure 3-7, the user is returned to the button options shown in Figure 3-4. Selecting the "Return To Residential Main Menu" button returns the user to the opening screen the user encountered when entering the HAW-RES spreadsheet, as illustrated in Figure 3-2. Selecting the Update Calculations button "UPDATE" takes the user to the main options page for running DSAM. Multiple options are provided in this screen. If the user desires to update all programs for all counties for the residential sector at the same time, the "UPDATE ALL ISLANDS AT ONE TIME!" button is selected. If the user only wishes to update all of the programs within a single county, then the user selects one of the Individual Island Updates buttons (OAHU, HAWAII, MAUI, or KAUAI). If the user wishes to update a single program at a time within a single county, then the user selects one of the Individual Program Updates buttons (OAHU, HAWAII, MAUI, or KAUAI).

FIGURE 3-8

Selecting one of the Individual Program Updates buttons takes the user to another set of button options. Selecting the county of Maui, Figure 3-9 illustrates the button options available to the user. Nine options are provided the user. Once the user selects an option, DSAM calculates the DSM impacts for that program in that county only. Upon completion, the user has the option of selecting another program or returning to the main menu. Selecting the "Return To Main Menu" button returns the user again to the opening screen the user encountered when entering the HAW-RES spreadsheet, as illustrated in Figure 3-2.

Selecting the "OUTPUT" button takes the user to the Output button options screen. This screen is illustrated in Figure 3-10. Selecting the Detailed Tables & Graphs button, Detailed T & G, opens the "RFINALL" spreadsheet identified in the lower portion of Figure 3-1. Figure 3-11 illustrates the screen the user is taken to once the Detailed T & G button is selected. The spreadsheet "RFINALL" contains all of the residential sector detailed tables and graphs resulting from running DSAM. Quattro Pro memory limitations require the disaggregation of DSAM output as illustrated in Figure 3-1. As DSAM is run, raw model results are dumped into the "OUTRES" spreadsheet. This spreadsheet contains no formatting or graphs since both of these functions are memory intensive. The "RFINALL" spreadsheet takes portions of the output from "OUTRES" and formats it into tables and creates graphs of the output. The peak demand impacts are estimated in "RFINALL" by applying the appropriate peak hour impacts from the file "R-SHAPE".

The spreadsheet "R-SHAPE" contains the values by program category of the hourly DSM impacts for the peak day for each month of the year (288 hours per program) as well as the monthly share of DSM impact as a percent of annual DSM impact. These hourly load shapes and monthly shares were developed using the DOE-2 building simulation runs. NEOS selected one measure to represent each residential program category for estimating peak demand. The measures selected by category are as follows:

• Refrigerators/Freezers	-	Refrigerators >10% of 93 Standards
• Lighting	-	Compact Fluorescent Bulbs
• Water Heat	-	Efficient Water Heating Tanks
• Clothes Dryers	-	Moisture Sensors
• Room Air Conditioning	-	Room A/C to 10.5 EER
• Central Air Conditioning	-	Central A/C to 12 EER
• Cooking	-	Reflector Pans

FIGURE 3-9

MAUI

Return To Main Menu

Lighting	Lighting
Clothes Drying	Clothes Dryer
Refrigerator/Freezer	Refrig/Freezer
Cooking	Cooking
Water Heat	Water Heater
Room A/C	Room A/C
Central A/C	Central A/C
Gas Measures	Gas Measures
Load Controls	Load Controls

FIGURE 3-10

OUTPUT

Detailed Tables & Graphs

Program Summary Tables

ENERGY 2020 Data Conversion

FIGURE 3-11

<p>STATE OF HAWAII HAWAII PROGRAM</p> <p>DBEDT DSM MODEL</p> <p>Detailed Table and Graph Output Module</p> <p><i>Created by NEOS Corporation, 1994</i></p>

RETURN

Dates When Model Results Last Saved

DATES SAVED

Output - Program Tables

OUTPUT Program Tables

Output - Electric Graphs

OUTPUT Electric Graphs

Output - Gas Graphs

OUTPUT Gas Graphs

UPDATE TABLES & GRAPHS:

UPDATE

Last Updated
November 30, 1994

The memory limitations of Quattro Pro requires the splitting up of several functions, such as the formatted output tables and graphs of results. If DSAM has been run since the "Last Updated" date shown in Figure 3-11, then the Update Tables & Graphs button "UPDATE" must be selected. Selecting this button refreshes the data contained in "RFINALL" to the most current available from DSAM. Once the data is refreshed, then the other button options shown in Figure 3-11 can be selected.

The first button, "DATES SAVED", provides the user a listing of the dates when the DSAM model results were last saved. An illustration of this screen is provided in Figure 3-12. Selecting the "Return To Main Menu" button returns the user to the screen illustrated in Figure 3-11.

Selecting the second button, "OUTPUT-Program Tables", takes the user to the Residential Program Tables screen as illustrated in Figure 3-13. Within this screen, the user has a multitude of options for both viewing and printing output tables. If the user selects the option to view an individual table, she/he will be taken to the appropriate statewide total table for the selected choice. To view individual county tables for the same selection, the user would activate the "Group Mode" option of Quattro Pro and move to the appropriate county pages of the spreadsheet. Each county page is identified by a Quattro Pro page tab at the bottom of the spreadsheet. After finishing with the Residential Program Tables screen, the user selects the "Return To Main Menu" button to return to the screen illustrated in Figure 3-11.

The third button, "OUTPUT-Electric Graphs", takes the user to the Residential - Electric Graphs screen. This screen is depicted in Figure 3-14. Here, the user is provided the options to view or print all or some of the residential sector electric graphs. The slide show buttons provide the user a quick review of all of the graphs within a slide show category. Each graph within a slide show stays on the screen for about five seconds. Again, selecting the "Return To Main Menu" button returns the user to the screen illustrated in Figure 3-11.

The last button, "OUTPUT-Gas Graphs", provides the user with similar options as those provided by the "OUTPUT-Electric Graphs" button explained earlier. Figure 3-15 presents the screen for Residential - Gas graphs. Selecting the "Return To Main Menu" button returns the user to the screen illustrated in Figure 3-11.

FIGURE 3-12

DATES WHEN MODEL RESULTS LAST SAVED

	OAHU	HAWAII	MAUI	KAUAI
Residential Lighting	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Clothes Drying	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Refrigerator/Freezer	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Cooking	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Water Heat	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential HVAC Measures For Homes With Room A/C	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential HVAC Measures For Homes With Central A/C	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Gas Clothes Drying	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Gas Water Heat	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential A/C Controls	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94
Residential Water Heater Controls	29-Nov-94	29-Nov-94	29-Nov-94	29-Nov-94

FIGURE 3-13

RESIDENTIAL PROGRAM TABLES

			Return To Main Menu		
			VIEW		
			Energy	Peak	
			PRINT		
			Print All Tables		
"ELECTRIC"	TOTAL		TOTAL	TOTAL	TOTAL
	Lighting		Lights	Lights	Lights
	Clothes Drying		Clothes	Clothes	Clothes
	Refrigerator/Freezer		Eng/Freez	Eng/Freez	Eng/Freez
	Cooking		Cook	Cook	Cook
	Water Heat		Water	Water	Water
	Room A/C		Room A/C	Room A/C	Room A/C
	Central A/C		Cent A/C	Cent A/C	Cent A/C
	Controls		Controls	Controls	Controls
"GAS"	TOTAL		G-TOTAL		G-TOTAL
	Clothes Drying		G-Clothes		G-Clothes
	Water Heat		G-Water		G-Water

FIGURE 3-14

RESIDENTIAL - ELECTRIC
GRAPHS

Return To Main Menu

Slide Show - Energy

Slide Show - Peak

ENERGY

PEAK

Energy By Island

Peak By Island

VIEW

PRINT

Energy

Peak

Print All Graphs

TOTAL

TOTAL

TOTAL

Lighting

Clothes Drying

Refrigerator/Freezer

Cooking

Water Heat

Room A/C

Central A/C

Lights

Clothes

Frig/Freez

Cook

Water

Room

Central

Lights

Clothes

Frig/Freez

Cook

Water

Room

Central

Lights

Clothes

Frig/Freez

Cook

Water

Room

Central

Load Controls

Controls

Controls

FIGURE 3-15

RESIDENTIAL - GAS GRAPHS

Return to Main Menu

Slide Show - Energy

ENERGY

VIEW
Energy

PRINT

Print All Graphs

TOTAL

TOTAL

TOTAL

Clothes Drying

Clothes

Clothes

Water Heat

Water

Water

Having finished with the Detailed Table and Graph Output Module, the user selects "RETURN" to go back to the OUTPUT screen illustrated by Figure 3-10. The next button to select in the OUTPUT screen is for Program Summary Tables. Selecting the button "Program Summary" loads the spreadsheet "RFINSUM" that is identified in the lower portion of Figure 3-1. The spreadsheet "RFINSUM" contains all of the residential sector summary tables resulting from running DSAM. As with the "RFINALL" spreadsheet discussed earlier, Quattro Pro memory limitations require its creation from the raw model results spreadsheet "OUTRES". The "RFINSUM" spreadsheet takes portions of the output from "OUTRES" and formats it into the summary tables.

Figure 3-16 depicts the screen the user sees after selecting the "Program Summary" button identified in Figure 3-10. If DSAM has been run since the "Last Updated" date shown in Figure 3-16, then the Update Summary Tables button "UPDATE!" must be selected. Selecting this button refreshes the data contained in "RFINSUM" to the most current available from DSAM. Once the data is refreshed, then the "Output-Program Tables" button can be selected.

After selecting the "Output-Program Tables" button, the user is taken to the screen illustrated by Figure 3-17. Here, the user is provided the options to view or print all or some of the residential summary tables. If the user selects the option to view an individual table, she/he will be taken to the appropriate Oahu summary table for the selected choice. To view the other individual county tables for the same selection, the user would activate the "Group Mode" option of Quattro Pro and move to the appropriate county pages of the spreadsheet. Each county page is identified by a Quattro Pro page tab at the bottom of the spreadsheet. After finishing with the Residential Summary Tables screen, the user selects the "Return To Main Menu" button to return to the screen illustrated in Figure 3-16.

Having finished with the DSM PROGRAM SUMMARY page, the user selects "RETURN" to go back to the OUTPUT screen illustrated by Figure 3-10. The last button to select in the OUTPUT screen is for ENERGY 2020 Data Conversion. Selecting the button "ENERGY 2020" loads the spreadsheet "CONV2020". Figure 3-18 shows the screen resulting from selecting the "ENERGY 2020" button. The ENERGY 2020 model requires output in a certain format and the macro contained within the button "UPDATE!" creates the necessary tables for ENERGY 2020. The files created by "CONV2020" are by county in *.wk1 format.

FIGURE 3-16

<p>STATE OF HAWAII DBEDT DSM MODEL</p> <p>DSM PROGRAM SUMMARY - HAWAII SPECIFIC DSM</p> <p><i>Created by NEOS Corporation, 1994</i></p>
--

RETURN

UPDATE SUMMARY TABLES:

UPDATE

Last Updated
November 30, 1994

Output - Summary Tables

OUTPUT: Program Tables

FIGURE 3-17

RESIDENTIAL SUMMARY TABLES

		<div>Return To Main Menu</div>	
		VIEW	PRINT
			<div>Print All Tables</div>
"ELECTRIC"	Lighting	<div>Lights</div>	<div>Lights</div>
	Clothes Drying	<div>Clothes</div>	<div>Clothes</div>
	Refrigerator/Freezer	<div>Frig/Freez</div>	<div>Frig/Freez</div>
	Cooking	<div>Cook</div>	<div>Cook</div>
	Water Heat	<div>Water</div>	<div>Water</div>
	Room A/C	<div>Room A/C</div>	<div>Room A/C</div>
	Central A/C	<div>Cent A/C</div>	<div>Cent A/C</div>
	A/C Controls	<div>A/C Con</div>	<div>A/C Con</div>
"GAS"	Water Controls	<div>Wat Con</div>	<div>Wat Con</div>
	Clothes Drying	<div>G-Clothes</div>	<div>G-Clothes</div>
	Water Heat	<div>G-Water</div>	<div>G-Water</div>

FIGURE 3-18

<p>STATE OF HAWAII</p> <p>DBEDT DSM MODEL</p> <p>CONVERT DSM MODEL OUTPUT TO ENERGY 2020 INPUT</p> <p><i>Created by NEOS Corporation, 1994</i></p>	<p>RETURN</p>
---	----------------------

UPDATE CONVERSION

Last Updated
November 30, 1994

The spreadsheet "PARTIC", which contains the annual program participation rates, is not directly accessed from the spreadsheet "HAW-RES" for editing purposes. To modify or review the assumptions contained with "PARTIC", the user must load the software in the conventional Quattro Pro manner. Discussions on the meaning and source of the values within "PARTIC" are provided in Volume 2 of the Final Report. Within "PARTIC", annual participation rates can vary at the measure level by county, housing type, and fuel type. Figure 3-19 partially illustrates a portion of this spreadsheet.

The spreadsheet "DSMRES", which contains DSM measure characteristics, is also not directly accessed from the spreadsheet "HAW-RES" for editing purposes. To modify or review the assumptions contained with "DSMRES", the user must load the software in the conventional Quattro Pro manner. Much of the information contained in "DSMRES" is summarized in the datasheets contained in Final Report Reference Volume 1 which details the final residential building types and the DOE2-1 developed UECs. The variables "Environmental Costs/Benefits" and "Perform Factor" are not currently used by DSAM but are there for potential future use. The variable "Perform Factor" would be used to modify measure life values to account for premature shortening of life caused by such factors as remodeling or dissatisfaction. Identification of mutual exclusivity and intra-active measures are based on NEOS professional judgement. How these variables are utilized is discussed in Volume 2 of the Final Report. Other variables and their sources are identified in Table 3-1.

FIGURE 3-19

OAHU Single Family DSM Measure Participation Rates

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Compact Fluorescent - 3 Bulbs (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
T-8 Lamp w/Elec Ballast (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Halogen Lamps (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Moisture Sensor (Single Family)	0.31%	0.63%	1.23%	2.20%	3.54%	4.95%	6.09%	6.84%	7.27%	7.49%	7.59%
Microwave Clothesdryer (Single Family)	0.31%	0.63%	1.23%	2.20%	3.54%	4.95%	6.09%	6.84%	7.27%	7.49%	7.59%
Heatpump Clothesdryer (Single Family)	0.31%	0.63%	1.23%	2.20%	3.54%	4.95%	6.09%	6.84%	7.27%	7.49%	7.59%
Refrigerator >10% 93 Standards (Single Family)	0.20%	0.41%	0.80%	1.43%	2.30%	3.21%	3.96%	4.45%	4.72%	4.87%	4.94%
Refrigerator-SERP (Single Family)	0.20%	0.41%	0.80%	1.43%	2.30%	3.21%	3.96%	4.45%	4.72%	4.87%	4.94%
Freezer >10% 93 Standards (Single Family)	0.20%	0.41%	0.80%	1.43%	2.30%	3.21%	3.96%	4.45%	4.72%	4.87%	4.94%
Remove Second Refrigerator (Single Family)	0.07%	0.14%	0.26%	0.47%	0.76%	1.06%	1.31%	1.47%	1.56%	1.61%	1.63%
Reflector Pans (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Efficient Tank (Single Family)	0.29%	0.59%	1.14%	2.05%	3.28%	4.59%	5.66%	6.36%	6.75%	6.95%	7.05%
Faucet Aerators (4 per Home) (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Low Flow Shower -New & Replace (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Pipe Insulation (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Horizontal Axis Clotheswasher (Single Family)	0.31%	0.63%	1.23%	2.20%	3.54%	4.95%	6.09%	6.84%	7.27%	7.49%	7.59%
Solar Water W/Electric Backup (Single Family)	5.00%	7.00%	10.00%	12.00%	15.00%	15.00%	12.00%	10.00%	5.50%	3.00%	2.00%
Heat Pump Water Heat (Single Family)	0.29%	0.59%	1.14%	2.05%	3.28%	4.59%	5.66%	6.36%	6.75%	6.95%	7.05%
Ex Room- R-0 to R-19 Ceiling Insulation (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Wall R0 to R-11 Wall Insulation (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Exist- Room A/C to 10.5 EER (Single Family)	0.27%	0.55%	1.06%	1.91%	3.06%	4.29%	5.28%	5.93%	6.30%	6.49%	6.58%
New Room- R-11 to R-19 Ceiling Insulation (Single Family)	4.06%	8.23%	15.95%	28.66%	45.96%	64.29%	79.22%	88.97%	94.47%	97.31%	98.71%
New- Room A/C to 10.5 EER (Single Family)	4.06%	8.23%	15.95%	28.66%	45.96%	64.29%	79.22%	88.97%	94.47%	97.31%	98.71%
Ex Cent- R-0 to R-19 Ceiling Insulation (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Wall R0 to R-11 Wall Insulation (Single Family)	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%
Exist- Central A/C to 12 EER (Single Family)	0.27%	0.55%	1.06%	1.91%	3.06%	4.29%	5.28%	5.93%	6.30%	6.49%	6.58%
New Cent- R-11 to R-19 Ceiling Insulation (Single Family)	4.06%	8.23%	15.95%	28.66%	45.96%	64.29%	79.22%	88.97%	94.47%	97.31%	98.71%
New- Central A/C to 12 EER (Single Family)	4.06%	8.23%	15.95%	28.66%	45.96%	64.29%	79.22%	88.97%	94.47%	97.31%	98.71%
A/C - Cycling (Single Family)	3.45%	6.99%	13.56%	24.36%	39.06%	54.65%	67.33%	75.63%	80.30%	82.71%	83.90%
Water Heating Controls (Single Family)	3.66%	7.40%	14.35%	25.79%	41.36%	57.86%	71.29%	80.08%	85.02%	87.58%	88.84%

TABLE 3-1
SOURCES FOR DSM MEASURE CHARACTERISTICS

Measure	Baseline Energy Use	Measure Input	Measure Life	Measure Cost
Efficient Electric Water Heater	2	5	1	1
Efficient Gas Water Heater	2	5	1	1
Faucet Aerators (4 per home)	2	5	6	1
Low Flow Showerhead	2	5	7	1
Hot Water Pipe Insulation	2	5	1	1
Horizontal Axis Clotheswasher	2	5	1	1
Solar Water Heat	9	11	1	8
Heat Pump Water Heater	2	5	1	12
Integral Compact Fluorescent - 15 Watts (Bulbs Replaced)	14	1	1	13
T-8 Lamp, Electronic Ballast, 4 Foot Fixture	14	5	15	13
Halogen Lamp - 45 Watts (SFAM 2 Bulbs, MFAM 1 Bulb Replaced)	14	16	15	13
Efficient Refrigerator/Freezer, 10%>1993 Standard	17	Calculated	1	13
Efficient Refrigerator/Freezer, meets SERP Standard	17	19	1	18
Efficient Freezer, Upright, Manual Defrost, 10%> 1993 Standard	17	Calculated	1	13
Remove Second Refrigerator	14	14	1	1
Cooktop Reflector Pans	20	1	18	1
Clothes Dryer Moisture Sensor	20	1	1	13
Microwave Dryer	20	19	18	13
Heat Pump Dryer	20	19	18	18
Ceiling Insulation, R-0 To R-19	5	5	21	4
Ceiling Insulation, R-11 To R-19	5	5	21	13
Wall Insulation, R-0 To R-11	5	5	21	18
Efficient Central Air Conditioner-SEER 12	5	5	21	13
Efficient Room Air Conditioner-EER 10.5	5	5	18	13
A/C Cycling	-	3	3	3
Water Heater Cycling Control	-	3	3	3

TABLE REFERENCES

1. Barakat & Chamberlin, Inc., *Hawaii Demand-Side Management Measures Handbook And Database, Version 1.0*, December, 1993.
2. DOE-2.1D analysis based on UECs developed for Hawaii Electric Company's Residential End-Use Energy Planning System (REEPS) Model.
3. Internal Southern California Edison program documents.
4. Northwest Power & Planning Council, *1991 Northwest Conservation and Electric Power Plan, Volume II - Part 1*, May, 1991.
5. DOE-2.1 analysis.
6. Hawaii Electric Company 1993 DSM IRP filing developed by Synergic Resources Corporation.
7. Puget Sound Power & Light, *1991 Estimates of Conservation Potential*, developed by Gary Cullen.
8. Using Reference #1 with \$4,000 for a solar water heating system minus \$600 for an efficient electric water tank and \$486 for an efficient gas water tank.
9. The baseline for solar water heat reflects a segmentation in the population. Only homes with four or more residents will qualify. Usage = 4,884 kWh and 272 Therm per testimony by Alan Lloyd before the USDOE, June 8, 1994.
10. Based on a savings estimate of 90% per discussion with DBEDT staff, May, 1994.
11. Testimony of Alan Lloyd before the USDOE, June 8, 1994.
12. California Energy Commission, *California Conservation Inventory Cost Database*, May 1992.
13. Results from Hawaii Electric Company's Residential End-Use Energy Planning System (REEPS) Model.
14. Kauai Electric's 1993 DSM IRP filing.
15. Based on replacing a 100 Watt incandescent bulb with a 45 Watt Halogen bulb and operating the bulb on an average of 2 1/2 hours per day.
16. California Energy Commission, *California Conservation Inventory Technology Database*, May 1994.
17. XENERGY, *SCE Energy Efficiency Potential Study*, June, 1991.
18. National Resources Defense Council, testimony of Peter Miller on *Uncommitted DSM Forecasts and Assumptions* before the California Energy Commission, November 16, 1993.
19. Baseline results from ENERGY 2020.
20. Energy Management Services, *DSM Measure Life Study*, prepared for the California DSM Measurement Advisory Committee (CADMAC), August 10, 1993.

4.0 COMMERCIAL SECTOR

Figure 4-1 illustrates the flowchart of files used to develop the DBEDT DSM assessment for the commercial sector. The top portion of the figure reflect input files, the middle box the actual DSM model and the bottom portion the output files. Each of these files currently exist and reflect the DOE-2 results and ENERGY 2020 forecast results as of December, 1994. If different ENERGY 2020 forecast results are to be used by DSAM, the appropriate ENERGY 2020 output files (SATCOMH.TAB, SATCOMK.TAB, SATCOMM.TAB, and SATCOMO.TAB) must be copied into the HAWCOM subdirectory.

The commercial portion of DSAM is initiated by starting the spreadsheet "COM". The spreadsheet "COM" itself only performs the function of providing a window to the other portions of the commercial sector portion of DSAM. The main computational spreadsheet is "HAW-COM" which is identified as the middle box of Figure 4-1. "HAW-COM" is the commercial sector equivalent to "HAW-RES". The residential sector equivalent of "COM" is contained within "HAW-RES". Figure 4-2 illustrates the opening screen the user encounters when entering the COM spreadsheet. Four options are provided the user; to run the model, to review/update input data, to review model output for electric DSM measures, or to review model output. The user presses the appropriate button to perform the next desired task.

Figure 4-3 depicts the Run Options available to the user. Because of Quattro Pro memory limitations, DSAM cannot be run for the entire State of Hawaii at one time. Rather, each of the counties must be run individually for electric DSM measures with Honolulu county split into two separate runs (Oahu #1 and #2). For gas, because of the fewer DSM gas measures, the entire state can be run at one time or, if preferred, each county can be run individually. The date of the latest run by county and fuel type is provided for the users convenience. Once all desired activity for this screen is complete, the user selects the button "Return To Main Menu" to access the other options identified in Figure 4-2.

Figure 4-4 illustrates the Input Review/Update Files options available to the user after selecting the "Input Files" button. Several options are available. The first option deals with updating the DSM database for the commercial sector. Again, because of memory, this is a two step process with two separate DSMCOM files created.

**FIGURE 4-1
HAWAII DBEDT DSM FORECASTING MODEL FLOWCHART
COMMERCIAL SECTOR**

FIGURE 4-2

FIGURE 4-3

RUN OPTIONS

(Close Any Input or Output Files Opened)

ELECTRIC			GAS		
		LAST RUN			LAST RUN
OAHU #1	<input type="button" value="Oahu #1"/>	05-Nov-94	OAHU #1	<input type="button" value="Oahu #1"/>	05-Nov-94
OAHU #2	<input type="button" value="Oahu #2"/>	05-Nov-94	OAHU #2	<input type="button" value="Oahu #2"/>	05-Nov-94
HAWAII	<input type="button" value="Hawaii"/>	05-Nov-94	HAWAII	<input type="button" value="Hawaii"/>	05-Nov-94
MAUI	<input type="button" value="Maui"/>	05-Nov-94	MAUI	<input type="button" value="Maui"/>	05-Nov-94
KAUAI	<input type="button" value="Kauai"/>	05-Nov-94	KAUAI	<input type="button" value="Kauai"/>	05-Nov-94
			<input type="button" value="Run Gas For All Islands"/>		

FIGURE 4-4

Input Updates
			LAST SAVED
DSM Database		15-Oct-94	
(Run DSMCOM1 First. Because of memory requirements, you will be reverted back to the Windows screen)		19-Oct-94	
Energy Forecast
(Need to Update When New Forecast Is To Be Used)			
Annual Program Participation
Program Characteristics
Peak Impacts		02-Nov-94	
(Because of memory requirements, you will be reverted back to the Windows screen)			

DSMCOM1 is used for Honolulu county and DSMCOM2 is used by the remaining three counties. These two files need be updated only if the DOE-2 runs are updated or the cost information is updated. Because of the huge number of DSM measures in the file (about 60 measures per building type times 15 building types times 4 counties), development of these two spreadsheets is automated through the use of macros. This is unlike the residential sector that requires manual replacement of values as new values are developed for use in DSMRES. Therefore, the user will unlikely directly access DSMCOM1 or DSMCOM2 except out of curiosity. Energy impacts all come from DOE2-1 building energy simulation runs with the results detailed in the Final Report Reference Volume 1. Intra-active code and mutual exclusivity code values were developed based on NEOS professional judgement. Measure life and measure cost data came from Barakat & Chamberlin¹ when available. Missing data was obtained from the California Conservation Inventory². Potential market share information was based on a study for Southern California Edison³ along with NEOS professional judgement. As with DSMRES, the Environment Cost/Benefit column is not used by DSAM.

The second option available through the screen illustrated in Figure 4-4 is the updating of the ENERGY 2020 forecast input values. This update is accomplished by selecting the "Energy Forecast" button. This option need only be taken if a new ENERGY 2020 forecast is to be utilized by DSAM or if new information becomes available through utility survey efforts on baseyear floorspace and/or baseyear end-use fuel saturation levels. Upon selection of the "Energy Forecast" button, the "CFOR2020" spreadsheet is opened and the user is taken to the screen illustrated in Figure 4-5. Three options are provided. Selecting the first option, to change the baseline floorspace estimates by pressing "BASEFLOOR", the user is taken to the screen shown in Figure 4-6. Here, 1992 baseline estimates of floorspace by building type and county are listed. These values can be modified as new information becomes available. The current values are based on an estimation technique that incorporates energy use per square foot energy use values developed by HECO to support their COMMEND Forecasting Model applied to the sales forecast values provided by ENERGY 2020.

¹ Barakat & Chamberlin, Inc., *Hawaii Demand-Side management Measures Handbook and Database, Version 1.0*, December, 1993.

² California Energy Commission, *California Conservation Inventory Technology Database*, May, 1994

³ XENERGY, *Appendix A: DSM ASSYST Input Files, DSM Technology Assessment Study*, Prepared for Southern California Edison, April, 1994

FIGURE 4-5

**ENERGY FORECAST MODEL OUTPUT MODULE
USED FOR INPUT
INTO THE HAWAII DBEDT DSM MODEL**

Return to Main Program

- o To Update the Forecast Values, Press the "UPDATE" Button
- o To Change Baseline Floorspace Estimates, Press the "BASE FLOOR" Button

BASE FLOOR

- o To Change Baseline Saturation Estimates, Press the "BASE SAT" Button

BASE SAT

UPDATE

LAST UPDATED
September 17, 1994

FIGURE 4-6

Baseline Floorspace

OAHU	HOTEL	LG OFFICE	SM OFFICE	RETAIL	GROCERY	WAREHOUSE	SCHOOL	COLLEGE	HEALTH	REST	MM APTS	MISC
Baseline Year:												
1992	23,704	31,476	13,834	22,528	4,095	7,941	8,831	5,967	5,848	8,695	21,430	20,618
HAWAII												
Baseline Year:												
1992	5,133	0	2,067	2,581	789	0	2,120	0	0	690	509	6,135
MAUI												
Baseline Year:												
1992	8,523	0	2,717	3,942	1,079	0	0	0	0	1,096	2,387	8,698
KAUAI												
Baseline Year:												
1992	3,409	0	1,919	842	484	0	0	0	0	362	0	4,235

Once modifications and/or review of baseline floorspace is complete, the user returns to the screen depicted in Figure 4-5 by selecting the "Return To Main" button. The second button option available in the Figure 4-5 illustration is to change baseline end-use saturation estimates. After pressing the button "BASE SAT" the user is taken to the screen shown in Figure 4-7. The values currently in place for all-fuel end-use saturations come from the HECO COMMEND model. The reason these values are needed is because ENERGY 2020 provides saturation at the end-use level by fuel type, but does not provide information about the total saturation of the end-use within the building type. For instance, ENERGY 2020 may tell us that 60 percent of the cooking fuel type is gas and 40 percent electric in Hotels. However, it never tells us that only 56.5% of the hotels on Oahu have cooking at all. Both values are necessary but ENERGY 2020 supplies only one.

After modification and/or review of baseline all-fuel end-use saturations is complete, the user returns to the screen depicted in Figure 4-5 by selecting the "Return To Main" button. If there is a new ENERGY 2020 forecast for DSAM to utilize or if modifications were made to the baseline estimates of floorspace or end-use saturation, the user selects the "UPDATE" button. Pressing this button refreshes the building stock characteristics inputs utilized by DSAM. Upon completion of all update activity, the user selects the "Return to Main Program" button to return to the screen depicted by Figure 4-4.

The next option available for selection is to review or modify the Annual Program Participation estimates. Development of these estimates is described in Volume 2 of the Final Report. Selection of the "Participation" button opens the "PARTCOM" spreadsheet. Figure 4-8 illustrates a portion of the "PARTCOM" spreadsheet. Annual program participation estimates are input by end-use for existing buildings and for all new buildings. A separate participation page is provided for each county. After review and/or modification to annual program participation rates, the user selects the "Return to Main Program" button to return to the screen depicted by Figure 4-4.

The next option available for selection is to review or modify the Program Characteristics input values. Selection of the "Program" button opens the "PROGRAM" spreadsheet. Figure 4-9 depicts the screen the user will see after selection of the button. This figure is identical to Figure 3-3, however the files are different and all Cross Program and Peak Information inputs must be entered again. To avoid repetition, the discussions on selecting the "Cross Program" and the "Peak Information"

FIGURE 4-7

BASELINE ALL-FUEL END-USE SATURATIONS

OAHU:	A/C	COOK	REFRIG	WATER
HOTEL	0.651	0.565	0.797	0.995
SM OFFICE	0.882	0.253	0.303	0.937
LG OFFICE	0.882	0.253	0.303	0.937
RETAIL	0.691	0.327	0.35	0.821
GROCERY	0.59	0.555	1	0.98
WAREHOUSE	0.48	0.095	0.453	0.652
SCHOOL	0.381	0.656	0.79	0.944
COLLEGE	0.381	0.656	0.79	0.944
HEALTH	0.892	0.767	0.8	0.9932
REST	0.761	0.951	1	0.9843
MM APTS	0.525	0.565	0.8	1
MISC	0.7	0.358	0.45	0.79

FIGURE 4-7

Electricity Main Program

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
EC-Refrig	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
ECooking	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
ECooling	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
EElights	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
GHotwater	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
EHotwater	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
Elights	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
EOffequip	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
EVent	4.06%	4.16%	7.72%	12.71%	17.30%	18.33%	14.93%	9.76%	5.50%	2.84%	1.40%	0.68%	0.32%	0.15%	0.07%	0.03%	0.02%	0.01%	0.00%	0.00%
New	4.06%	8.23%	15.95%	28.66%	45.96%	64.29%	79.22%	88.97%	94.47%	97.31%	98.71%	99.39%	99.71%	99.86%	99.94%	99.97%	99.99%	99.99%	100.00%	100.00%

FIGURE 4-9

HONOLULU COUNTY, ISLAND OF OAHU

buttons will not be repeated since they are the same as provided earlier in Section 3. The selection of the "Program Info - Com" button is slightly different than the selection of the "Program Info - Res" button. The screen the user would see after selection of the "Program Info - Com" button is depicted in Figure 4-10. The only variable not included in Figure 4-10 when compared to Figure 3-7 is the exclusion of the "Interaction Rate With Cooling" variable. In the commercial sector, this interaction is largely accounted for by the DOE-2 developed DSM measure impact estimates. Basecase commercial buildings always had air conditioning whereas for the residential sector, two base case buildings were utilized; one with and one without air conditioning.

Upon completion of all update and review activity for Program Characteristics, the user selects the "Return to Input Menu" button then the "Return to Commercial Main Program" button to return to the screen depicted by Figure 4-4. The last input option available through the screen depicted in Figure 4-4 is Peak Impacts. Selection of this button need only be made if there are changes resulting from re-running DOE-2 or changes are made to the peak hour or peak month identified in the Cross Program information. Selection of the "PEAK" button activates a macro that updates the information contained in the spreadsheet file "PEAKC". The user is not taken to this spreadsheet. The macro automatically accesses the appropriate files from DOETRAN to update the peak demand information. Unlike the residential sector, peak demand information is maintained for each measure and each building type. Figure 4-11 illustrates a portion of the "PEAKC" spreadsheet. The "PEAKC" spreadsheet contains the peak hour share of monthly energy (code 19) and the monthly energy share of annual DSM measure impact (code 200).

After all Input Updates are completed, the user selects the "Return to Main Menu" button to return to the screen depicted by Figure 4-2. The remaining two options available on the screen are 1) Review/Update Output Files - Electric, and 2) Review/Update Output Files - Gas. The screens and options available by selecting either of these buttons are identical, except that one is for electricity and one is for gas. To further avoid repetition, the remaining discussion will only focus on pressing the "Output Electric" button.

FIGURE 4-10

PROGRAM CHARACTERISTICS -COMMERCIAL PROGRAMS

	Tech & Econ Max Market Penetration	Market Spec Max Market Penetration	Hawaii Spec Max Market Penetration	Net To Gross Ratio	Admin Cost	Measure Life Decay Factor	Renewal Rate
C-Refrig	100%	80%	40%	85%	15%	0.75	50%
Cooking	100%	80%	40%	85%	15%	0.75	50%
Cooling	100%	80%	40%	85%	15%	0.75	50%
Exlights	100%	80%	40%	98%	9%	0.75	50%
Hotwater	100%	80%	40%	85%	15%	0.75	50%
Inlights	100%	80%	40%	98%	9%	0.75	50%
Offequip	100%	80%	40%	85%	15%	0.75	50%
Vent	100%	80%	40%	85%	15%	0.75	50%

FIGURE 4-11

measid	hour	Oct	measid	hour	Oct
LONE8502		19 0.001083235	LONE8502	200	0.082352024
LONE8503		19 0.001064698	LONE8503	200	0.082389437
LONE8505		19 0.002702851	LONE8505	200	0.085916608
LONE8507		19 0.003614315	LONE8507	200	0.063347313
LONE8508		19 0.001359604	LONE8508	200	0.082809559
LONE8509		19 0.002560439	LONE8509	200	0.084928506
LONE8511		19 0.002560439	LONE8511	200	0.084927831
LONE8515		19 0.003339131	LONE8515	200	0.075588457
LONE8517		19 0.002769663	LONE8517	200	0.074407643
LONE8518		19 0.018679565	LONE8518	200	0.051086328
LONE8521		19 0.0013387	LONE8521	200	0.084418548
LONE8522		19 0	LONE8522	200	0.088096153
LONE8541		19 0.003532237	LONE8541	200	0.085714432
LONE8542		19 0.00460872	LONE8542	200	0.087515533
LONE8543		19 0.003547804	LONE8543	200	0.085832894
LONE8544		19 0	LONE8544	200	0
LONE8546		19 0	LONE8546	200	0.055637236
LONE8547		19 -0.00921612	LONE8547	200	0.08345196
LONE8548		19 0.003788835	LONE8548	200	0.094194035
LONE8549		19 0.004089573	LONE8549	200	0.083810228
LONE8550		19 0.004307491	LONE8550	200	0.089758953
LONE8552		19 0.001957874	LONE8552	200	0.084734169
LONE8553		19 0.00192283	LONE8553	200	0.084527102
LONE8554		19 0.001112766	LONE8554	200	0.08135971
LONE8555		19 0.001296683	LONE8555	200	0.082284957
LONE8557		19 0.001059404	LONE8557	200	0.081829197
LONE8563		19 0.001402972	LONE8563	200	0.082060338
LONE8564		19 0.001032607	LONE8564	200	0.082122064
LOXE8501		19 0.001063508	LOXE8501	200	0.081649921
LOXE8502		19 0.001063508	LOXE8502	200	0.081649921
LOXE8503		19 0.001059705	LOXE8503	200	0.081586224
LOXE8504		19 0.003421644	LOXE8504	200	0.079011349
LOXE8507		19 0.00816286	LOXE8507	200	0.077473363
LOXE8508		19 0.001355078	LOXE8508	200	0.083272104
LOXE8509		19 0.002560198	LOXE8509	200	0.084936168
LOXE8510		19 0.002560327	LOXE8510	200	0.08493061
LOXE8511		19 0.002560199	LOXE8511	200	0.084932665
LOXE8515		19 0.003237452	LOXE8515	200	0.079459726
LOXE8517		19 0.002290844	LOXE8517	200	0.073840742
LOXE8518		19 0.002893315	LOXE8518	200	0.082721058
LOXE8519		19 0.002211241	LOXE8519	200	0.078206628
LOXE8521		19 0.001330791	LOXE8521	200	0.08400509
LOXE8522		19 0	LOXE8522	200	0.088082118
LOXE8523		19 0.001344095	LOXE8523	200	0.082965274
LOXE8541		19 0.003455657	LOXE8541	200	0.084485128
LOXE8542		19 0.003754817	LOXE8542	200	0.081108559
LOXE8543		19 0.003429323	LOXE8543	200	0.084235705
LOXE8544		19 0.0024397	LOXE8544	200	0.076679441
LOXE8545		19 0.0024397	LOXE8545	200	0.076896211
LOXE8546		19 0.002290844	LOXE8546	200	0.073840742
LOXE8547		19 -0.02952253	LOXE8547	200	0.128059978
LOXE8548		19 0.003650305	LOXE8548	200	0.092513251
LOXE8549		19 0.003477298	LOXE8549	200	0.075996901
LOXE8550		19 0.003835585	LOXE8550	200	0.086909485
LOXE8552		19 0.001823349	LOXE8552	200	0.084681855
LOXE8553		19 0.00183178	LOXE8553	200	0.084246003
LOXE8554		19 0.001131268	LOXE8554	200	0.08153254
LOXE8555		19 0.001287152	LOXE8555	200	0.082210625
LOXE8557		19 0.001060338	LOXE8557	200	0.081548718
LOXE8561		19 0.001073499	LOXE8561	200	0.081711723
LOXE8563		19 0.001561492	LOXE8563	200	0.083532451
LOXE8564		19 0.001039411	LOXE8564	200	0.082878917

Upon pressing the "Output Electric" button, the user is taken to another menu of buttons. This screen is illustrated in Figure 4-12. A series of output buttons are available for Detailed Tables & Graphs and for Summary Tables. Within each category, the options available upon pressing the next button are the same. Therefore, selecting the "STATE TOTAL" button will serve as the example for the family of Detailed Tables & Graphs buttons.

After pressing the button "STATE TOTAL", the user is taken to the screen depicted by Figure 4-13. Because of Quattro Pro memory limitations, it is necessary to press the "UPDATE" button after any re-runs of DSAM in order to refresh data. Pressing "UPDATE" is only necessary if DSAM has created changes to the DSM assessment. The date of the last update is provided for the users information. Once the file has been updated, the user has the option to print or view the detailed tables and graphs output. Pressing the "Return" button returns the user to the screen depicted by Figure 4-12.

Using the "OAHU SUMMARY" button within the "Summary Tables" family as the example, the user is taken to the screen depicted by Figure 4-14. As with the Detailed Tables & Graphs family, the spreadsheets within the Summary Tables family must be updated after any changes made by DSAM. No "UPDATE" is necessary if no changes were made by DSAM. The date of the last update is provided for the users information. Once the file has been updated, the user has the option to print or view the summary table output. Pressing the "Return" button returns the user to the screen depicted by Figure 4-12. Pressing the "Return to Main Menu" button returns the user to the screen depicted by Figure 4-2.

Each of the summary spreadsheets includes the information necessary for transfer to ENERGY 2020. If the ENERGY 2020 users wish the Quattro Pro files converted to EXCEL, this is accomplished by saving each file in EXCEL format through the Quattro Pro "Save As" command.

FIGURE 4-12

FIGURE 4-13

DSM HAWAII PROGRAM STATE OF HAWAII

LAST UPDATED: 04-Nov-94

VIEW GRAPHS

PRINT GRAPHS

VIEW TABLES

PRINT TABLES

FIGURE 4-14

OAHU COMMERCIAL SECTOR SUMMARY TABLES

FILES LAST UPDATED: 04-Nov-94

UPDATE:

VIEW TABLES

PRINT TABLES