

DOE-2.2 sample Output

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Sample Weather Processor Reports	

LOADS SUMMARY REPORTS

		Bldg Level Info		Space Level Info											
		LS-A	LS-B	LS-C	LS-D	LS-E	LS-F	LS-G	LS-H	LS-I	LS-J	LS-K	LS-L	Space Peak Loads	Space Peak Load Components
THERMAL LOAD	Total (Sens&Lat) Heat/Cool Space Load		P	P		T	T							Bldg Peak Load Components	Building Monthly Loads
	Sensible Heat/Cool Space Load	P	P	P	P/T	T	T							Space Monthly Load Components	Bldg Monthly Load Components
	Latent Cooling Space Load		P	P		T	T							Space Daylighting Summary	Space Energy Reduction by Daylight
	Heat/Cool Space Load Components		P	P		T	T							Bldg Energy Reduction by Daylight	Daylight Illuminance Frequency
	Heat/Cool Peak Hour, Date, OA	■	■	■										Space Inputs Fuel Summary	Window Management & Solar
ELECTRIC ENERGY	Total (Lights/Plugs/Process)				P/T										
	Lights												T		
	Equipment / Plugs												T		
	Process Electric												T		
OTHER ENERGY	Process Fuel												T		
	Domestic Hot Water												T		
	Solar Gain												P/T		
DAYLIGHTING	% Lighting Reduction						■								
	% Lighting Reduction Scatter Plot							■	■						
	Ave. Daylight Illuminance						■								
	Ave. Glare Index						■								
	% Hrs. Glare Too High						■								
	Frequency of Illuminance Levels											■			
OTHER	Floor Area & Volume		■	■											
	Weather File Name	■	■	■	■	■	■	■	■	■	■	■	■	■	■
	DESIGN-DAY reports provided ①	■	■	■	■	■	■	■	■	■	■	■	■	■	■

NOTES:

T = Total energy or Total load reported for these items

P = Peak demand or Peak load reported for these items

① Duplicate reports are provided for each LOADS report (if DESIGN-DAYs are used) where the first set of reports provides results for the design day conditions. A complete second set reports the annual simulation results.

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

SYSTEMS SUMMARY REPORTS

THERMAL ENERGY	Total (Sens&Lat) Heat/Cool Coil Load
	Sensible Heat/Cool Coil Load
	Latent Heat/Cool Coil Load
	Zone Coil Heat/Cool Load
	Baseboard Heat
	Pre-heat
	Heat/Cool Addition/Extraction
	Cooling Peak Hour, Date, OA
	Heating Peak Hour, Date, OA
	Heat/Cool Peak Load Hourly Profile
	Max Daily Integrated Cooling Load
	Heat Coincident w Cool Peak
	Natural Ventilation Cooling ③
ELECTRIC ENERGY	Total Elec (LOADS + Fans, DX, Reheat)
	Total Elec Coincident w Cool Peak
	Heating/Cooling Elec Use
	Fan Total Elec
	Fan Elec for H/C/Coincident/Float
	Fan Elec for Supply/Return/Hot Deck
	Auxiliary/Fan/Pump Elec
OTHER ENERGY	Heating/Cooling Fuel Use
	Waste Heat
HOURS	Hours Heat/Cool/Float/Available
	Fan Hours
	Hours Night Venting/Night Cycle On
	Hours Loads Not Met
	Zone Hrs at Max Demand
	Hours at RH ranges
SPACE TEMPERATURE	Average (H/C/Fans On/Off)
	Min / Max
	Indoor/Outdoor Temp. Delta
	Scatter Plot
OTHER	Air Flow
	Heat/Cool Capacity
	Heat/Cool E-I-R
	Relative Humidity Scatter Plot
	Sensible Heat Ratio
	Delta Humidity Ratio
	Equipment Part Load Ratio
	Weather File Name
	DESIGN-DAY report provided

Building HVAC Load Summary	SS-D	SS-E	SS-M	SS-A	SS-B	SS-C	SS-H	SS-I	SS-J	SS-K	SS-R	SS-L	SS-N	SS-P ①	SS-Q	SS-G	SS-F	SS-O
Building HVAC Load Hours	P/T			P/T				P	P					P/T	T	P/T		
Building HVAC Fan Electric								T										
System Loads Summary								T										
System Loads Summary																		
System Load Hours																		
System Utility Energy Use																		
Sensible/Latent Summary																		
Peak Heating & Cooling																		
Space Temperature Summary																		
Zone Performance Summary																		
Fan Electric Energy Use																		
Relative Humidity Summary																		
System Heat/Cool Performance																		
HP Heat/Cool Performance																		
Zone Loads Summary																		
Zone Demand Summary																		
Space Temperature Summary																		

BUILDING AIR HANDLER

ZONE

NOTES:

T = Total energy or Total load reported for these items

P = Peak demand or Peak load reported for these items

① SS-P at air handler level is provided for unitary systems

② SS-P at zone level is provided for water loop heat pumps and heat pump PTACs

③ Ventilative Cooling is provided only for system types: RESYS, PSZ

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

PLANT SUMMARY REPORTS

THERMAL LOAD	by Total Plant	Cooling & Heating
		Waste Heat Recovery
	by Plant Equipment ①	Circulation Loop Loads
		Boilers, Chillers, Pumps, Towers, etc. Loads
		Equipment Capacity
		Equipment Part Load Ratio
		Loads Not Satisfied (Loops only)
		Thermal Losses (Loops & Pumps only)
UTILITY ENERGY	by Total Plant, Site	Annual
		Monthly
		Energy Use Intensity (EUI)
		Total Electric & Total Fuel Use
		Electric Generation Fuel Use
	by Total Plant, Source	Annual
		Monthly
	by Utility Type ②	Annual
		Monthly
	by Utility Meter ③	Annual
		Monthly
	by End Use	Annual, by utility type
		Monthly, by utility type
		Annual, by utility meter
		Monthly, by utility meter
		Cooling & Heating (only) Input
	by Plant Equipment ①	Boilers, Chillers, Pumps, Towers, etc.
HOURS	Hour & Date of Peak	
	Equipment Operations Hours	
	% Hours Outside Throttling Range	
	% Hours Loads Not Met	

	Plant Energy Utilization	Utility & Fuel Use Summary	Equipment Loads & Energy Use	Circulation Loop Loads	Energy End-Use, by Utility Type	Energy End-Use, by Utility Meter	Building Energy Performance	Building Utility Performance	Loads & Energy Use, by Plant Component
	PS-A	PS-B	PS-C	PS-D	PS-E ②	PS-F ③	BEPS	BEPU	PS-H ④
T									
T									
				P/T					P/T
		P/T							P/T
									P
			■	■					■
				P/T					P/T
				P/T					P/T
T							T	T	
T									
							T	T	
T				T					
T							T		
	P/T			P/p/T					
	P/T			P/p/T					
	P/T				P/p/T	T	T		
	P/T				P/p/T				
				P/p/T					
				P/p/T					
					P/p/T	T	T		
					P/p/T				
T									
		P/T							P/T
	■	■	■	■	■				■
		■	■						■
							■	■	
							■	■	

NOTES:

T = Total load or Total energy reported for these items

P = Peak load or Peak demand (COINCIDENT) reported for these items

p = NON-COINCIDENT Peak demand reported for these items

① One copy of the PS-H report is produced for each plant component, i.e., for each circulation loop, pump, chiller, etc.

② One copy of the PS-E report is produced for each utility type, i.e., for all electric use and for all fuel use.

③ One copy of the PS-F report is produced for each utility meter, i.e., one report for each electric or fuel meter.

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

ECONOMICS SUMMARY REPORTS

			Annual Operations Costs & Savings	Life-Cycle Non-Energy Costs	Energy Savings & Life-Cycle Costs	Energy Cost Summary	Utility Rate Summary	Block Charges & Ratchets, by Utility Rate	Summary of Pollutants	Pollutant Production, by Block Charge
			ES-A	ES-B	ES-C	ES-D	ES-E ①	ES-F ②	ES-G	ES-H
ANNUAL Results	by Utility Rate ①	Energy Use				T				
		Total Utility Costs (\$)				T	T			
		Total Utility Costs (\$/sqft)				T				
		Total Utility Costs (ave \$/billing unit)				T				
		Component Charges					P/T			
		Metered & Billing Use					P/T			
	by Block or TOU Charge ②	Total Utility Costs (\$)						T		
		Component Charges						P/T		
		Pollutant Production							T	T
MONTHLY Results	by Utility Rate ①	Total Utility Costs (\$)					T			
		Component Charges					P/T			
	by Block or TOU Charge ②	Total Utility Costs (\$)						T		
		Component Charges						P/T		
		Pollutant Production							T	T
LIFE-CYCLE Results	Costs	Installation, Repair, Replacement		T	T					
		Energy	T		T					
		Operations	T		T					
	Savings	Energy	T		T					
		Operations	T		T					
		Energy + Operations	T		T					
	Investment Statistics	Discounted Payback			T					
		S-I-R, cost			T					
		S-I-R, energy			T					

NOTES:

T = Total energy or Total costs reported for these items

P = Peak demand or Peak demand costs reported for these items

① One copy of the ES-E report is produced for each utility rate.

② One copy of the ES-F report is produced for each utility rate that includes at least one BLOCK-CHARGE.

left-to-right order of report columns above corresponds to top-down order of reports printed in DOE2 output files

DOE2 Output Quality Control

Ensuring the validity of DOE2 analysis results requires our best engineering and systems experience. There are several general principles that can help assure quality analysis with any detailed simulation tool, including:

- ◆ thorough insight into the inner workings of the simulation tool.
- ◆ thorough knowledge of the technologies being modeled
- ◆ focus on those portions of the model that are critical to your analysis
- ◆ use modeling procedures that will help prevent errors of omission

In addition to these general principles, there are at least three procedures you can use to check and assess the quality of simulation results. These include:

- 1) Develop and use output QC check lists and rules of thumb.
- 2) Report analysis results in a format that facilitates your own internal QC procedures (e.g., check the incremental impacts reported for each modeled measure).
- 3) Use output differencing or delta utilities to check key model features and measures.

Examples of each of these are provided in this section.

"10 Minute" DOE2 Output QC Checklist

Report	Check	Comments
BEPU	Percent of hours outside throttling range	Eq. size, control (see SS-R, SS-F, and SS-O)
BEPU	Percent of hours loads not satisfied	Equip sizing, control (see PS-C, and PS-H)
BEPS	Energy use & cost intensity	Btu/sqft/year from BEPS, (\$/sqft/year from ES-D)
BEPU	Energy use by category	Compare relative magnitudes
PS-E	kW and kWh by end-use (annual & monthly)	to check W/sqft, get conditioned area from LS-C
PS-D	Peak loads on loops	compare peak load (PS-D) with equip size (PV-A)
PS-C	Peak load & equipment sizes	compare peak load (PS-C) with equip size (PV-A)
PS-C	Calculate overall equipment efficiencies	Load met / energy used (see SS-P for unitary eq.)
PS-C	Equipment part-load ranges (annual)	for monthly - see PS-H, for unitary equip - see SS-P
PS-C	Total equipment operating hours	for monthly - see PS-H, for unitary equip - see SS-P
PS-A	Monthly pattern of heating and cooling loads	confirm realistic pattern (compare also SS-D & LS-D)
SS-J	System load and size checks	sqft/ton, cfm/sqft, min osa/per, cool/heat pk (Btuh/sf)
* any *	Proper weather file used	reported at top right corner of most reports

"30 Minute" DOE2 Output QC Checklist

Report	Check	Comments
⑩ LV-A	Proper weather file used	also reported at top right corner of most reports
LV-B	Lighting density in each space	0.6 - 2.5 W/sf, confirm no lights in plenums
LV-C	Average space height for each space	DOE2 bases this on volume/area
LV-D	Total (opaque + glass) wall area by orientation	approx equal areas for opposite orientations
LS-B	Peak space load per sqft for each space	perimeter: $\sim 25 \text{ Btu/sf*win/flr ratio*SC+Internal}$
LS-C	Peak space load per sqft (building total)	$\% \text{ core*core Btuh/sf} + \% \text{ perim*perim Btuh/sf}$
LS-C	Outdoor temperatures coincident with peak	these are used in outdoor air design load calcs.
LS-C	Building net area (modeled area)	compare to known gross building area
LS-D	Peak lighting + plug load density	compare to inputs for lights & plugs (see also PS-F)
⑧ LS-D	Monthly pattern of heating and cooling loads	confirm realistic pattern (see also SS-D & PS-A)
SV-A	Amount of outside air (if not scheduled)	check or reasonable values
SV-A	Sensible heat ratio	check or reasonable values
SS-D	Peak cooling load, square feet per ton	compare with PS-D and/or PS-C (if built-up equip)
⑧ SS-D	Monthly pattern of heating and cooling loads	confirm realistic pattern (see also LS-D & PS-A)
SS-E	Cooling & heating hours & availability	ensure realistic hours
SS-A	For unitary DX, monthly pattern of loads	unitary loads are not totaled in SS-D
⑤ SS-P	Average EER for unitary DX	cooling load / (compressor+fan kWh)
⑨ SS-J	System load and size checks	sqft/ton, cfm/sqft, min osa/per, cool/heat pk (Btuh/sf)
① SS-K	Avg temperature, cooling and heating hours	Compare to t-stat set points (includes unconditioned!)
① SS-O	Hours under cooled/heated by time-of-day	Compare to t-stat set points & throttling range
① SS-F	Hours under cooled/heated by zone	Excessive hours indicate faulty control
① SS-R	Hours under cooled/heated by system	Excessive hours indicate faulty control
PV-A	Equipment sizes	compare with peak loads on PS-C and PS-D
⑧ PS-A	Monthly pattern of heating and cooling loads	confirm realistic pattern (compare SS-D & LS-D)
⑤ PS-C	Calculate overall equipment efficiencies	Load met / energy used (see SS-P for unitary eq.)
⑥ PS-C	Equipment part-load ranges (annual)	for monthly - see PS-H, for unitary equip - see SS-P
⑦ PS-C	Total equipment operating hours	for monthly - see PS-H, for unitary equip - see SS-P
④ PS-E	kW and kWh by end-use (annual & monthly)	to check W/sqft, get conditioned area from LS-C
③ PS-H	Average operating ratios	Equip sizing & load management check
PS-H	Peak load & equipment sizes	peak load & equipment size, 300 to 700 sqft/ton
① BEPU	Percent of hours outside throttling range	Eq. size, control, schedules (see SS-R, SS-F, SS-O)
① "	Percent of hours loads not satisfied	Equip sizing, control & schedules (see PS-C, PS-H)
② BEPU	Energy use by category	Compare relative magnitudes
② "	Energy use & cost intensity	Btu/sqft/year from BEPU, (\$/sqft/year from ES-D)

① *primary check item*

① *secondary check item (related to a primary check)*

Suggested Reporting Format

Annual Energy Use Detailed Results - Example Office Building

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	Ambient Lights kWh	Misc Eq. kWh	SHW Therms	Annual HVAC Energy					Annual Energy Total			
				Heating kWh	Cooling kWh	Fans kWh	Twr Fans kWh	Pumps kWh	Nat Gas Therms	Elect kWh	Total Site Mbtu	Total Source Mbtu
Annual Energy Use												
0 Base Case	166,654	48,526	0	0	108,632	26,050	1,171	44,540	5,860	395,573	1,936	4,636
1 0+3' Overhang	166,654	48,526	0	0	83,393	20,734	809	36,650	4,800	356,766	1,698	4,133
2 1+6' Overhang	166,654	48,526	0	0	71,077	18,338	682	31,625	4,070	336,902	1,557	3,857
3 2+Reduced LPD	133,324	48,526	0	0	65,068	16,357	605	29,841	4,500	293,720	1,452	3,457
4 3+Daylighting	84,042	48,526	0	0	55,513	14,648	468	26,291	5,020	229,488	1,285	2,852
5 4+0.6 kW/ton Chiller	84,042	48,526	0	0	34,663	14,648	403	25,227	5,020	207,509	1,210	2,627
Incremental Savings (negative entries indicate increased use)												
1 0+3' Overhang	0	0	0	0	25,239	5,316	362	7,890	1,060	38,807	238	503
2 1+6' Overhang	0	0	0	0	12,316	2,396	127	5,025	730	19,864	141	276
3 2+Reduced LPD	33,330	0	0	0	6,009	1,981	77	1,784	(430)	43,182	104	399
4 3+Daylighting	49,282	0	0	0	9,555	1,709	137	3,550	(520)	64,232	167	606
5 4+0.6 kW/ton Chiller	0	0	0	0	20,850	0	65	1,064	0	21,979	75	225
Cumulative Savings (relative to Case 0, negative entries indicate increased use)												
1 0+3' Overhang	0	0	0	0	25,239	5,316	362	7,890	1,060	38,807	238	503
2 1+6' Overhang	0	0	0	0	37,555	7,712	489	12,915	1,790	58,671	379	780
3 2+Reduced LPD	33,330	0	0	0	43,564	9,693	566	14,699	1,360	101,853	484	1,179
4 3+Daylighting	82,612	0	0	0	53,119	11,402	703	18,249	840	166,085	651	1,785
5 4+0.6 kW/ton Chiller	82,612	0	0	0	73,969	11,402	768	19,313	840	188,064	726	2,010

Peak Demand PRELIMINARY Detailed Results - Example Office Building

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			Ambient		Annual HVAC Demands (Non-Coincident)					Total	
			Lights kW	Misc Eq. kW	Peak Load Tons	Heating kW	Cooling kW	Fans kW	Clg Twrs kW	Pumps kW	Elect kW
Annual Peak Demand											
0	Base Case		54	15	67	0	71	14	2	10	162
1	0+3' Overhang		54	15	51	0	55	10	2	8	140
2	1+6' Overhang		53	15	43	0	47	9	1	7	131
3	2+Reduced LPD		42	15	38	0	43	8	1	7	116
4	3+Daylighting		42	15	32	0	38	6	1	6	88
5	4+0.6 kW/ton Chiller		42	15	32	0	25	6	1	6	75
Incremental Savings (negative entries indicate increased demand)											
1	0+3' Overhang		0	0	16	0	16	4	1	2	22
2	1+6' Overhang		1	0	7	0	8	1	0	1	9
3	2+Reduced LPD		11	0	5	0	4	1	0	0	15
4	3+Daylighting		0	0	6	0	6	2	0	1	28
5	4+0.6 kW/ton Chiller		0	0	0	0	13	0	0	0	13
Cumulative Savings (relative to Case 0, negative entries indicate increased demand)											
1	0+3' Overhang		0	0	16	0	16	4	1	2	22
2	1+6' Overhang		1	0	24	0	24	5	1	3	31
3	2+Reduced LPD		12	0	28	0	28	6	1	3	46
4	3+Daylighting		12	0	35	0	34	7	1	4	74
5	4+0.6 kW/ton Chiller		12	0	35	0	46	7	1	4	86

Annual Utility Costs PRELIMINARY Detailed Results - Example Office Building

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	Annual Utility Cost Total (\$)					Incremental	
	Nat Gas Total	Electric Energy	Electric Demand	Electric Total	Utility Total	First Cost (\$)	Simple Payback
Annual Costs							
0 Base Case	\$3,558	\$30,427	\$13,578	\$44,729	\$48,287	\$0	n/a
1 0+3' Overhang	\$3,022	\$27,442	\$11,891	\$40,057	\$43,079	\$50,000	n/a
2 1+6' Overhang	\$2,625	\$25,914	\$11,054	\$37,692	\$40,317	\$50,000	n/a
3 2+Reduced LPD	\$2,854	\$22,593	\$9,621	\$32,938	\$35,792	\$12,000	n/a
4 3+Daylighting	\$3,128	\$17,652	\$7,242	\$25,618	\$28,746	\$40,000	n/a
5 4+0.6 kW/ton Chiller	\$3,128	\$15,962	\$6,415	\$23,100	\$26,228	\$8,000	n/a
Incremental Savings (negative entries indicate increased costs)							
1 0+3' Overhang	\$536	\$2,985	\$1,687	\$4,672	\$5,208	(\$50,000)	9.6
2 1+6' Overhang	\$397	\$1,528	\$837	\$2,365	\$2,762	(\$50,000)	18.1
3 2+Reduced LPD	(\$229)	\$3,321	\$1,433	\$4,754	\$4,525	(\$12,000)	2.7
4 3+Daylighting	(\$274)	\$4,941	\$2,379	\$7,320	\$7,046	(\$40,000)	5.7
5 4+0.6 kW/ton Chiller	\$0	\$1,690	\$827	\$2,518	\$2,518	(\$8,000)	3.2
Cumulative Savings (relative to Case 0, negative entries indicate increased costs)							
1 0+3' Overhang	\$536	\$2,985	\$1,687	\$4,672	\$5,208	(\$50,000)	9.6
2 1+6' Overhang	\$933	\$4,513	\$2,524	\$7,037	\$7,970	(\$100,000)	12.5
3 2+Reduced LPD	\$704	\$7,834	\$3,957	\$11,791	\$12,495	(\$112,000)	9.0
4 3+Daylighting	\$430	\$12,775	\$6,336	\$19,111	\$19,541	(\$152,000)	7.8
5 4+0.6 kW/ton Chiller	\$430	\$14,465	\$7,163	\$21,629	\$22,059	(\$160,000)	7.3

Delta Reporting Format

The example output that follows presents DOE2 results from a chiller alternative where a base case reciprocating machine (1.0 kW/ton) was replaced with a newer model (0.6 kW/ton). Two PLANT reports are presented, PS-C and BEPU.

The reports are ordered to present the base case first, followed by the alternative, followed by the delta between them. For this example, the delta is equal to the alternative minus the base case. Therefore, any savings will appear as negative quantities in the delta report.

Note that the deltas are reported for any numeric characters not embedded within a character string.

Example PS-C Delta Output

Base Case (chiller kW/ton = 1.0)

Simple Office Practice Example w Expressions for overall bldg dimensions DOE-B2.2NT30 9/16/1998 6:24:15 BDL RUN 1
and daylighting in all perimeter zones
REPORT- PS-C Equipment Loads and Energy Use WEATHER FILE- LOS ANGELES, CA

		COOL LOAD	HEAT LOAD	ELEC USE	FUEL USE	Number of hours within each PART LOAD range											TOTAL	
SUM		(MBTU)	(MBTU)	(KWH)	(MBTU)	00	10	20	30	40	50	60	70	80	90	100	RUN	
MON	PEAK	(KBTU/HR)	(KBTU/HR)	(KW)	(KBTU/HR)	10	20	30	40	50	60	70	80	90	100	+	HOURS	

Boiler 1																		
SUM			-196.1		489.9	LOAD2618	563	142	62	12	6	3	0	0	0	0	3406	
PEAK			-572.7		840.1	FUEL1584	1322	270	102	90	26	9	3	0	0	0	3406	
MON/DAY			12/28		12/28													
Chiller 1																		
SUM		396.8		52120.4		LOAD1632	1419	919	490	137	19	4	0	0	0	0	4620	
PEAK		332.2		31.3		ELEC 285	1523	1223	877	532	158	20	2	0	0	0	4620	
MON/DAY		8/31		8/31														
Cooling Tower 1																		
SUM		663.5		468.4		LOAD 0	0	0	0	4619	1	0	0	0	0	0	4620	
PEAK		447.1		1.0		ELEC1063	604	271	51	10	0	0	0	0	0	0	1999	
MON/DAY		8/31		8/31														
CHW Pump																		
SUM				9850.1		FLOW 0	0	0	0	0	0	0	0	0	0	4620	4620	
PEAK				2.1		RPM 0	0	0	0	0	0	0	0	0	0	4620	4620	
MON/DAY				1/ 2		ELEC 0	0	0	0	0	0	0	0	0	0	4620	4620	
HW Pump																		
SUM				2662.8		FLOW 0	0	0	0	0	0	0	0	0	0	4620	4620	
PEAK				0.6		RPM 0	0	0	0	0	0	0	0	0	0	4620	4620	
MON/DAY				1/ 2		ELEC 0	0	0	0	0	0	0	0	0	0	4620	4620	
CW Pump																		
SUM				13755.5		FLOW 0	0	0	0	0	0	0	0	0	0	4620	4620	
PEAK				3.0		RPM 0	0	0	0	0	0	0	0	0	0	4620	4620	
MON/DAY				1/ 2		ELEC 0	0	0	0	0	0	0	0	0	0	4620	4620	

Example PS-C Delta Output

Alternative (chiller kW/ton = 0.6)

Simple Office Practice Example w Expressions for overall bldg dimensions

DOE-B2.2NT30

9/16/1998

6:27:52 BDL RUN 1

and daylighting in all perimeter zones

REPORT- PS-C Equipment Loads and Energy Use

WEATHER FILE- LOS ANGELES, CA

		COOL LOAD	HEAT LOAD	ELEC USE	FUEL USE	----- Number of hours within each PART LOAD range -----										TOTAL
		(MBTU)	(MBTU)	(KWH)	(MBTU)	00	10	20	30	40	50	60	70	80	90	100
MON	PEAK	(KBTU/HR)	(KBTU/HR)	(KW)	(KBTU/HR)	10	20	30	40	50	60	70	80	90	100	+
																HOURLS
Boiler 1																
	SUM		-196.1		489.9	LOAD	2618	563	142	62	12	6	3	0	0	3406
	PEAK		-572.7		840.1	FUEL	1584	1322	270	102	90	26	9	3	0	3406
	MON/DAY		12/28		12/28											
Chiller 1																
	SUM	396.8		31270.5	LOAD	1632	1419	919	490	137	19	4	0	0	0	4620
	PEAK	332.2		18.8	ELEC	285	1523	1223	877	532	158	20	2	0	0	4620
	MON/DAY	8/31		8/31												
Cooling Tower 1																
	SUM	589.0		403.3	LOAD	0	0	0	0	4620	0	0	0	0	0	4620
	PEAK	403.6		0.9	ELEC	1022	601	245	43	10	0	0	0	0	0	1921
	MON/DAY	8/31		8/31												
CHW Pump																
	SUM			9850.1	FLOW	0	0	0	0	0	0	0	0	0	0	4620 4620
	PEAK			2.1	RPM	0	0	0	0	0	0	0	0	0	0	4620 4620
	MON/DAY			1/ 2	ELEC	0	0	0	0	0	0	0	0	0	0	4620 4620
HW Pump																
	SUM			2662.8	FLOW	0	0	0	0	0	0	0	0	0	0	4620 4620
	PEAK			0.6	RPM	0	0	0	0	0	0	0	0	0	0	4620 4620
	MON/DAY			1/ 2	ELEC	0	0	0	0	0	0	0	0	0	0	4620 4620
CW Pump																
	SUM			12691.8	FLOW	0	0	0	0	0	0	0	0	0	0	4620 4620
	PEAK			2.7	RPM	0	0	0	0	0	0	0	0	0	0	4620 4620
	MON/DAY			1/ 2	ELEC	0	0	0	0	0	0	0	0	0	0	4620 4620

Example PS-C Delta Output

Delta Case (= Alternative - Base)

Simple Office Practice Example w Expressions for overall bldg dimensions
and daylighting in all perimeter zones
REPORT- PS-C Equipment Loads and Energy Use

DOE-B2.2NT30 9/16/1998 6:24:15 BDL RUN 0

WEATHER FILE- LOS ANGELES, CA

		COOL LOAD	HEAT LOAD	ELEC USE	FUEL USE	----- Number of hours within each PART LOAD range -----										----- TOTAL
SUM		(MBTU)	(MBTU)	(KWH)	(MBTU)	0	0	0	0	0	0	0	0	0	0	RUN
MON	PEAK	(KBTU/HR)	(KBTU/HR)	(KW)	(KBTU/HR)	0	0	0	0	0	0	0	0	0	0	+ HOURS
		-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----
Boiler 0																
SUM			.0		.0	LOAD2618	0	0	0	0	0	0	0	0	0	0
PEAK			.0		.0	FUEL1584	0	0	0	0	0	0	0	0	0	0
MON/DAY			12/28		12/28											
Chiller 0																
SUM		.0		20849.9		LOAD1632	0	0	0	0	0	0	0	0	0	0
PEAK		.0		12.5		ELEC	0	0	0	0	0	0	0	0	0	0
MON/DAY		8/31		8/31												
Cooling Tower 0																
SUM		74.5		65.1		LOAD	0	0	0	0	-1	1	0	0	0	0
PEAK		43.5		.1		ELEC1063	3	26	8	0	0	0	0	0	0	78
MON/DAY		8/31		8/31												
CHW Pump																
SUM				.0		FLOW	0	0	0	0	0	0	0	0	0	0
PEAK				.0		RPM	0	0	0	0	0	0	0	0	0	0
MON/DAY				1/ 0		ELEC	0	0	0	0	0	0	0	0	0	0
HW Pump																
SUM				.0		FLOW	0	0	0	0	0	0	0	0	0	0
PEAK				.0		RPM	0	0	0	0	0	0	0	0	0	0
MON/DAY				1/ 0		ELEC	0	0	0	0	0	0	0	0	0	0
CW Pump																
SUM				1063.7		FLOW	0	0	0	0	0	0	0	0	0	0
PEAK				.3		RPM	0	0	0	0	0	0	0	0	0	0
MON/DAY				1/ 0		ELEC	0	0	0	0	0	0	0	0	0	0

Example BEPU Delta Output

Base Case (chiller kW/ton = 1.0)

Simple Office Practice Example w Expressions for overall bldg dimensions DOE-B2.2NT30 9/16/1998 6:24:15 BDL RUN 1
and daylighting in all perimeter zones
REPORT- BEPU Building Utility Performance WEATHER FILE- LOS ANGELES, CA

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WIR	EXT USAGE	TOTAL
EMI ELECTRICITY													
KWH	84042.	0.	48526.	0.	55513.	468.	26291.	14648.	0.	0.	0.	0.	229488.
FMI NATURAL-GAS													
THERM	0.	0.	0.	4955.	0.	0.	70.	0.	0.	0.	0.	0.	5024.

TOTAL ELECTRICITY 229488. KWH 5.884 KWH /SQFT-YR GROSS-AREA 5.884 KWH /SQFT-YR NET-AREA
TOTAL NATURAL-GAS 5024. THERM 0.129 THERM /SQFT-YR GROSS-AREA 0.129 THERM /SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTILING RANGE = 0.1
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE: ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.

Alternative (chiller kW/ton = 0.6)

Simple Office Practice Example w Expressions for overall bldg dimensions DOE-B2.2NT30 9/16/1998 6:27:52 BDL RUN 1
and daylighting in all perimeter zones
REPORT- BEPU Building Utility Performance WEATHER FILE- LOS ANGELES, CA

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WIR	EXT USAGE	TOTAL
EMI ELECTRICITY													
KWH	84042.	0.	48526.	0.	34663.	403.	25227.	14648.	0.	0.	0.	0.	207509.
FMI NATURAL-GAS													
THERM	0.	0.	0.	4955.	0.	0.	70.	0.	0.	0.	0.	0.	5024.

TOTAL ELECTRICITY 207509. KWH 5.321 KWH /SQFT-YR GROSS-AREA 5.321 KWH /SQFT-YR NET-AREA
TOTAL NATURAL-GAS 5024. THERM 0.129 THERM /SQFT-YR GROSS-AREA 0.129 THERM /SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTILING RANGE = 0.1
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = 0.0

NOTE: ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.

Example BEPU Delta Output

Delta Case (= Base - Alternative)

Simple Office Practice Example w Expressions for overall bldg dimensions
and daylighting in all perimeter zones

DOE-B2.2NT30 9/16/1998 6:24:15 BDL RUN 0

1

REPORT- BEPU Building Utility Performance

WEATHER FILE- LOS ANGELES, CA

	LIGHTS	TASK LIGHTS	MISC EQUIP	SPACE HEATING	SPACE COOLING	HEAT REJECT	PUMPS & AUX	VENT FANS	REFRIG DISPLAY	HT PUMP SUPPLEM	DOMEST HOT WTR	EXT USAGE	TOTAL
EM1 ELECTRICITY													
KWH	0.	0.	0.	0.	20850.	65.	1064.	0.	0.	0.	0.	0.	21979.
FM1 NATURAL-GAS													
THERM	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

TOTAL ELECTRICITY	21979. KWH	.563 KWH	/SQFT-YR GROSS-AREA	.563 KWH	/SQFT-YR NET-AREA
TOTAL NATURAL-GAS	0. THERM	.000 THERM	/SQFT-YR GROSS-AREA	.000 THERM	/SQFT-YR NET-AREA

PERCENT OF HOURS ANY SYSTEM ZONE OUTSIDE OF THROTTLING RANGE = .0
PERCENT OF HOURS ANY PLANT LOAD NOT SATISFIED = .0

NOTE: ENERGY IS APPORTIONED HOURLY TO ALL END-USE CATEGORIES.