



Building Operator Certification – Level I



*A Partnership of the
NYC Department of Education
Division of School Facilities,
International Union of Operating
Engineers, and the
City University of New York*



Dennis M. Walcott, Chancellor



Class 23

Objectives and Agenda

- Load Profiles & Trends, PM and the IBM dashboard
- Split into 2 sections:
 - Computer Lab section
 - Classroom section
- Computer Lab section:
 - Portfolio Manager and the IBM dashboard
- Classroom section:
 - Load Profiles & Trends

Class Overview

- 9:00 – 9:15 Attendance, Quiz
- 9:15 – 10:30 One class to Computer Lab – PM and IBM energy dashboard tools
- 9:15 – 10:30 One class in classroom – Load Profiles and Analysis, Practical Project Workshop
- 10:30 – 10:45 Break
- 10:45 – 12:00 Classes switch



Quiz and Exercise

Quiz

Handout

VARIANCE CHART			
	Current Year	Previous Year	% Change
\$\$	357,000	326,000	9.5%
SF	265,000	250,000	6.0%
\$/SF	1.35	1.30	3.3%
BTU/SF	92,800	98,700	-6.0%
DD	4,300	3,955	8.7%
BTU/SF/DD	21.58	24.96	-13.5%

Practical Project 2B

How was Table 1?

TABLE 1 SUMMARY OF ANNUAL ENERGY USE BY ENERGY TYPE

GROSS FLOOR AREA = _____ SF

FOR THE YEAR SEPT 1, 2009 - AUGUST 31, 2010 UNLESS OTHERWISE NOTED

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
	Unit	QTY	MMBTU	\$	unit cost	\$/MMBTU	MMBTU / SF	\$ / SF	% of BTU	% of Cost
					(5)/(3)	(5)/(4)	(4)/(12)	(5)/(12)	(4)/(13)	(5)/(14)
Electricity	kwh									
Nat Gas	therm									
Fuel Oil, #__	gallon									
Steam	mlb									
other										
Total									100%	100%

NOTES:

1. MMBTU of all energy types are calculated at the Site Value
2. Building area (SF) is gross square footage, including basement

	BTU	Million BTU
kwh	3414	0.003414 kwh
nat gas	100000	0.100 therm
oil, #2	140000	0.140 gal
oil, #4	145000	0.145 gal
oil, #6	152500	0.153 gal

Visualizing with Pie Charts in IBM dashboard



Practical Project 2B

Let's go over procedure for Table 2

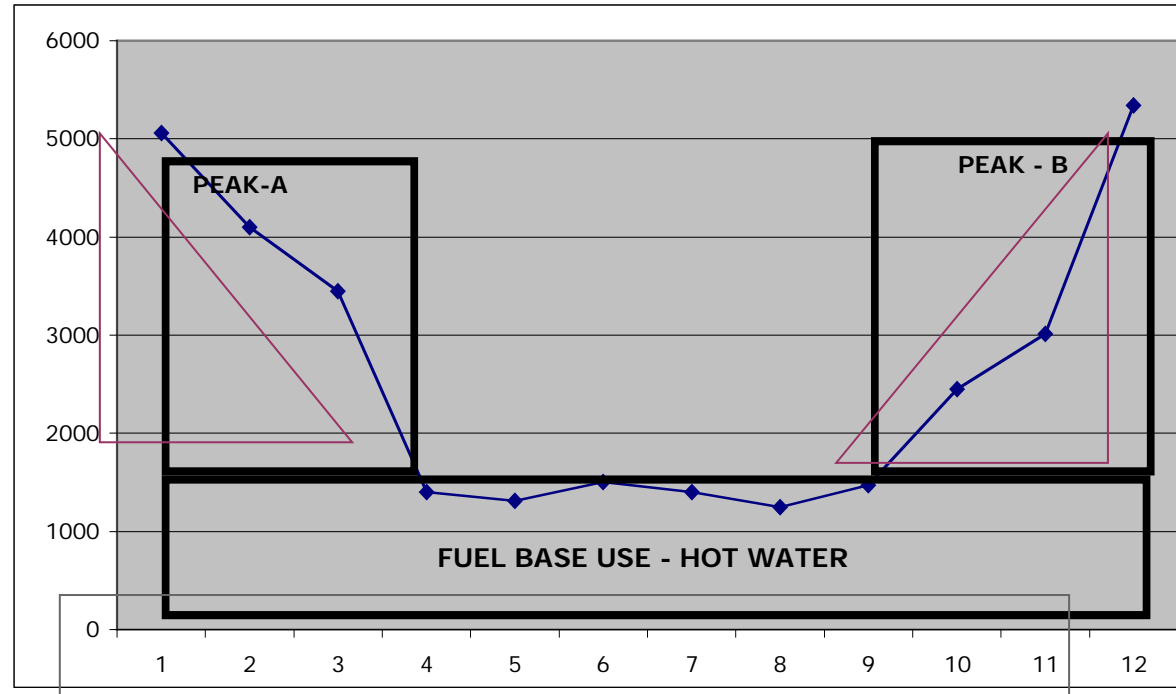
TABLE 2 ANNUAL ENERGY USE BY END-USE FUNCTION									
FOR THE YEAR SEPT 1, 2009 - AUGUST 31, 2010 UNLESS OTHERWISE NOTED									
	FUELS USED	default %	adjusted %	MMBTU	MMBTU/SF	% of TOTAL MMBTU	\$	\$ / SF	% OF TOTAL \$
		3	4	5	6	7	8	9	10
OIL, GAS, STEAM									
HEATING		70%							
HOT WATER		20%							
COOKING		10%							
OTHER		0%							
SUB-TOTAL		100%	100%						
ELECTRICITY									
LIGHTING		45%							
MOTORS		25%							
COMPUTERS & OFF EQUIP		10%							
AC		10%							
KITCHEN-REFRIG		10%							
HEATING & HOT WATER		see Note 1							
OTHER		0%							
SUB-TOTAL		100%	100%						
TOTAL						100%			100%



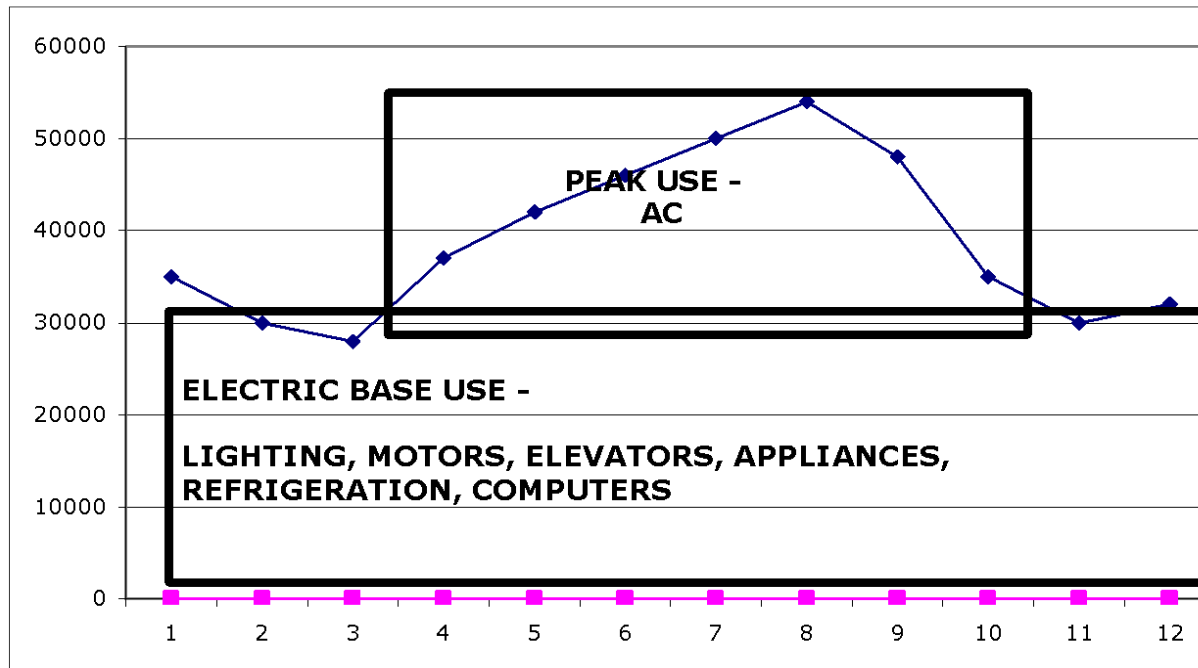
Fuel-use Profile and end-use - weather sensitive vs base-load

What to look for if:

- Exaggerated peaks?
- Very little peak?



Electric Profile and end-use

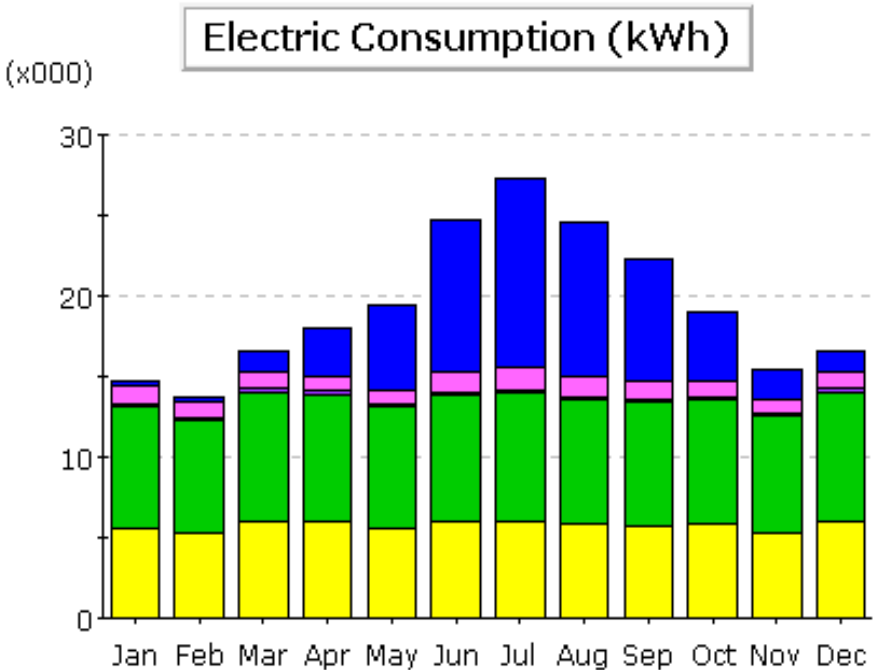


Why might an AC peak not show up?

- Some electric loads are less in summer
- Boiler are used for hot water only (or off)
- Less classroom lighting is used

Filling in the Electric Base-load

- Build equipment loads from bottom up, per Herzog
 - Lighting
 - Motors
 - Computers
 - **Kitchen**

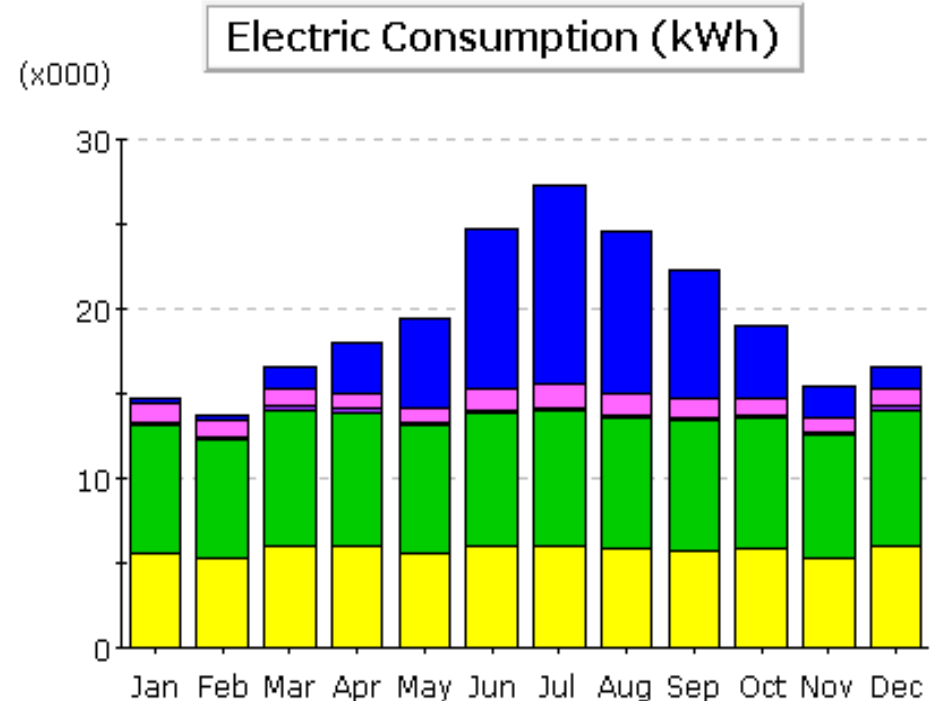


- | | | | |
|-----------------|------------------|---------------|----------------|
| Area Lighting | Exterior Usage | Water Heating | Refrigeration |
| Task Lighting | Pumps & Aux. | Ht Pump Supp. | Heat Rejection |
| Misc. Equipment | Ventilation Fans | Space Heating | Space Cooling |



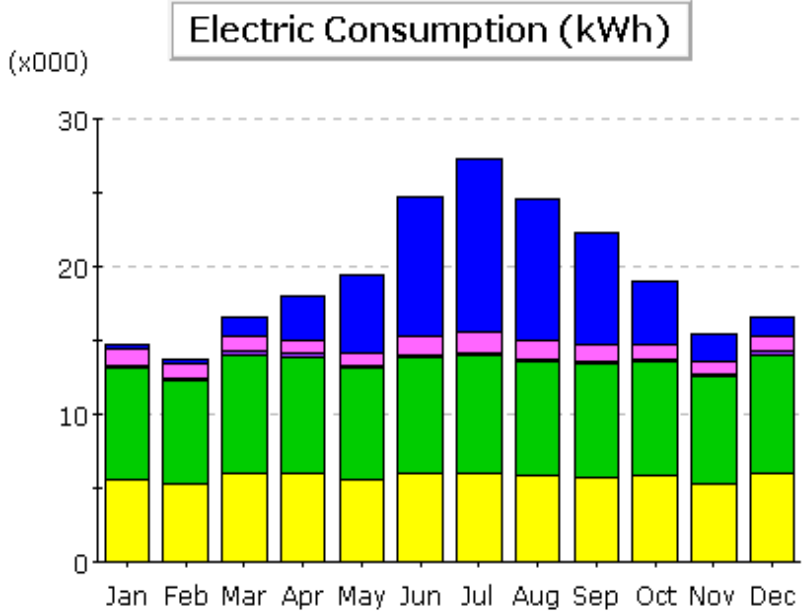
Filling in the Electric Base-load

- Build equipment loads from bottom up, per Herzog
- **Lighting – Expected Load**
 - Create a schedule based on survey-count and operating hours
- Add for ballast losses
 - 10% per Herzog, p 153



Filling in the Electric Base-load

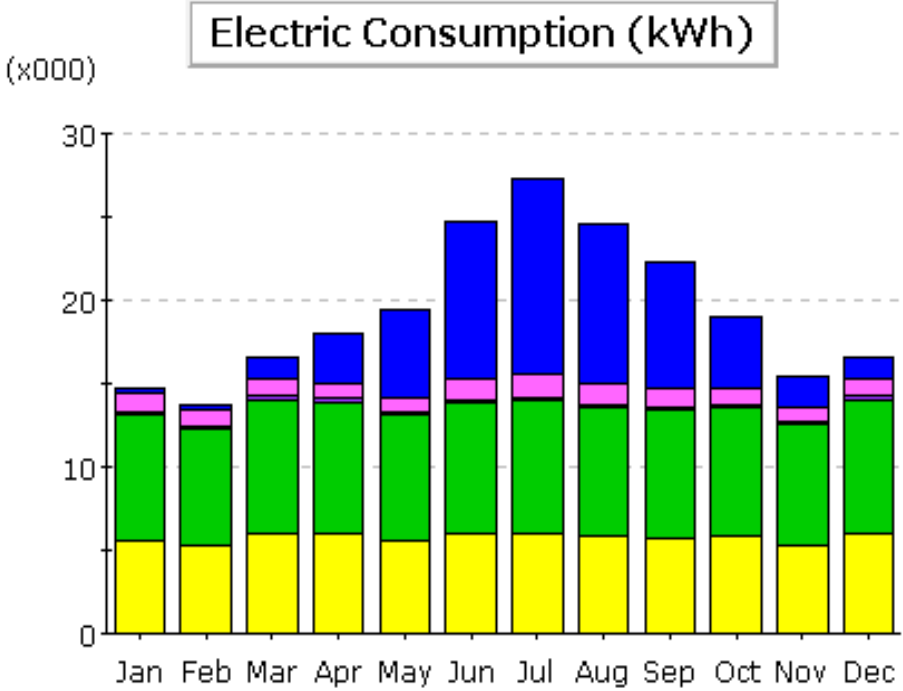
- Build equipment loads from bottom up, per Herzog
- **Largest Motors**
 - Survey
 - What are your largest motors?
 - Load factor
 - Use .55 kw/HP, per Herzog, p 156
 - Operating hours?



Filling in the Electric Base-load

What about Kitchens?

- Cooking
- Exhaust hood
- Refrigeration
- Washing



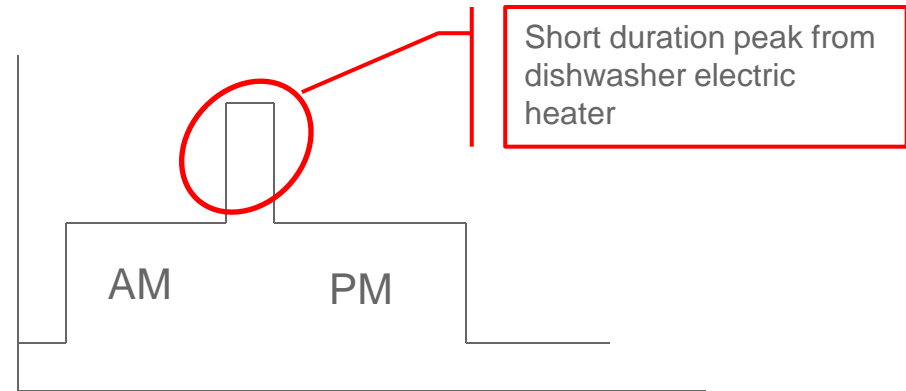
- Area Lighting
- Task Lighting
- Misc. Equipment
- Exterior Usage
- Pumps & Aux.
- Ventilation Fans
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- Space Heating
- Refrigeration
- Heat Rejection
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Dishwashing and Demand

What about Kitchens?

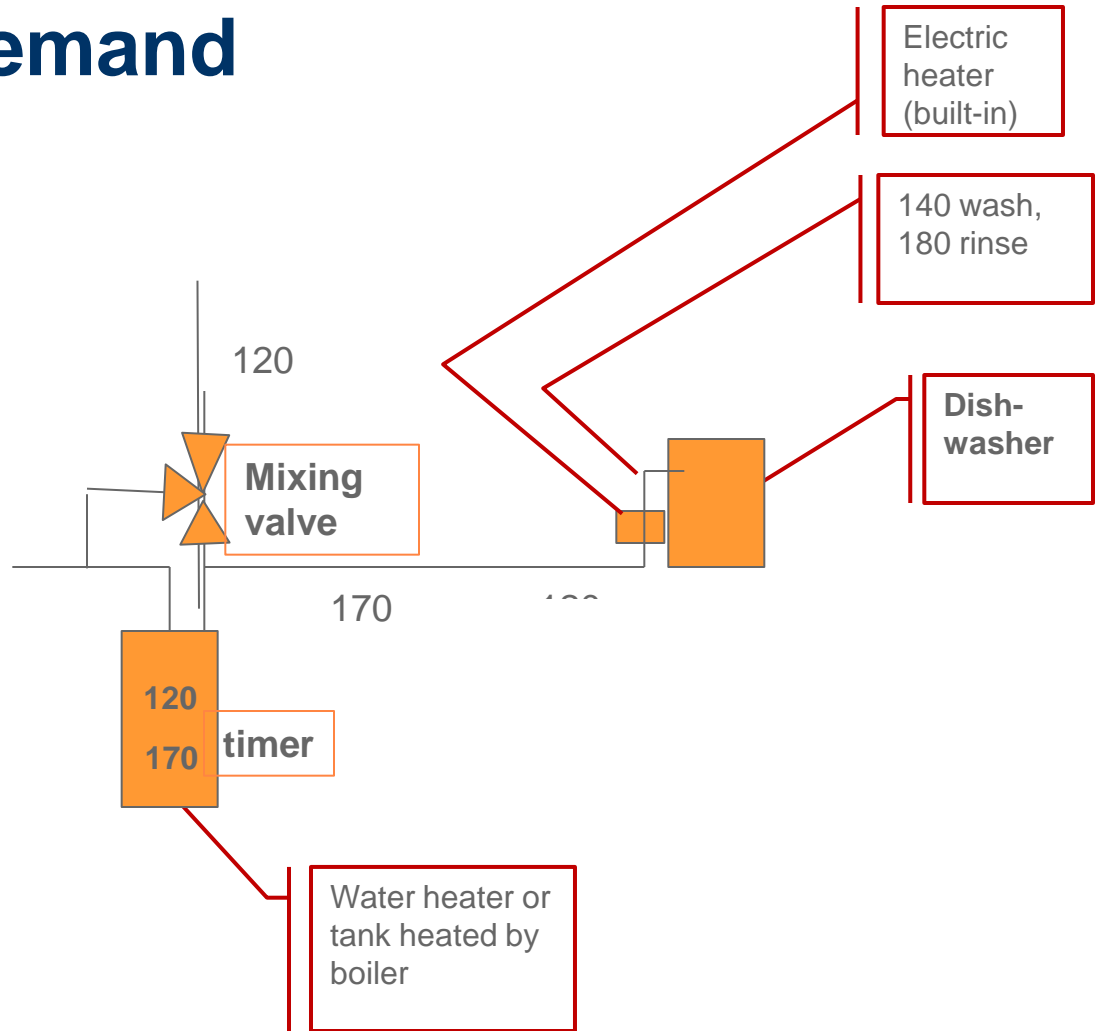
- ***Dishwashers and electric demand***
 - ***How can they cause a costly spike in electric demand?***
 - ***What can you do about it?***



Dishwashing and Demand

What about Kitchens?

- **Dishwashers and electric demand**
 - *How can they cause a costly spike in electric demand?*
 - *What can you do about it?*



Using IBM Tool for Comparison

- You can compare your school Year-to-year.
- You can compare your school to your Peers.
 - Who are your peers?
 - What factors to consider?
 - How can you use this capability to learn and improve?

Class Announcements

Computer Skills - Training

If you want to improve your basic computer skills, you can come to a short “Basics Skills” session. This will be at 20 minutes before the class start time in the Computer Lab.

Correction Forms – Portfolio Manager

If there is some information about your school on Portfolio Manager that you would like to correct, please return your Correction Form.



Class Assignments

Reading

Continue reading in **Herzog** – chapters 4, 5 + Appendix B.

If you have large electric motors that you will examine in your project, you should also read Herzog Appendix A

(Chapter 8 in FEMP, and materials on ESPM website - last week)

Practical Project

Bring in your first draft of Project 2B - Come to class next week with your Tables 1 and 2 ready to review. Review these with your classmates in the class.

Due Date is Week 25 – This is a Hard Date

