Resource Accounting: Track, Measure and Prosper

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WASHINGTON STATE UNIVERSITY
EXTENSION ENERGY PROGRAM

Overview

- Resource conservation management
- Resource accounting
- Resource accounting cycle
- Resource accounting tools
- Questionnaire results

Resource Conservation Management

- Manage energy and resource costs
- Promote energy/environmental awareness
- Maintain or increase occupant comfort
- Reduce greenhouse gas emissions

Resource Accounting

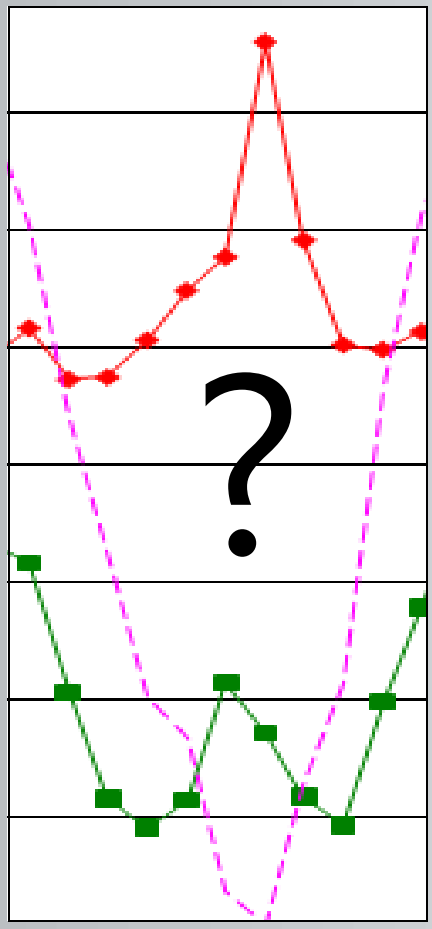
"What gets measured gets managed"

- Electricity
- Electrical Demand
- Fossil Fuels
- Water
- Sewer
- Solid Waste
- Recycling
- *and more*


Resource
Conservation
Management
Resource Accounting

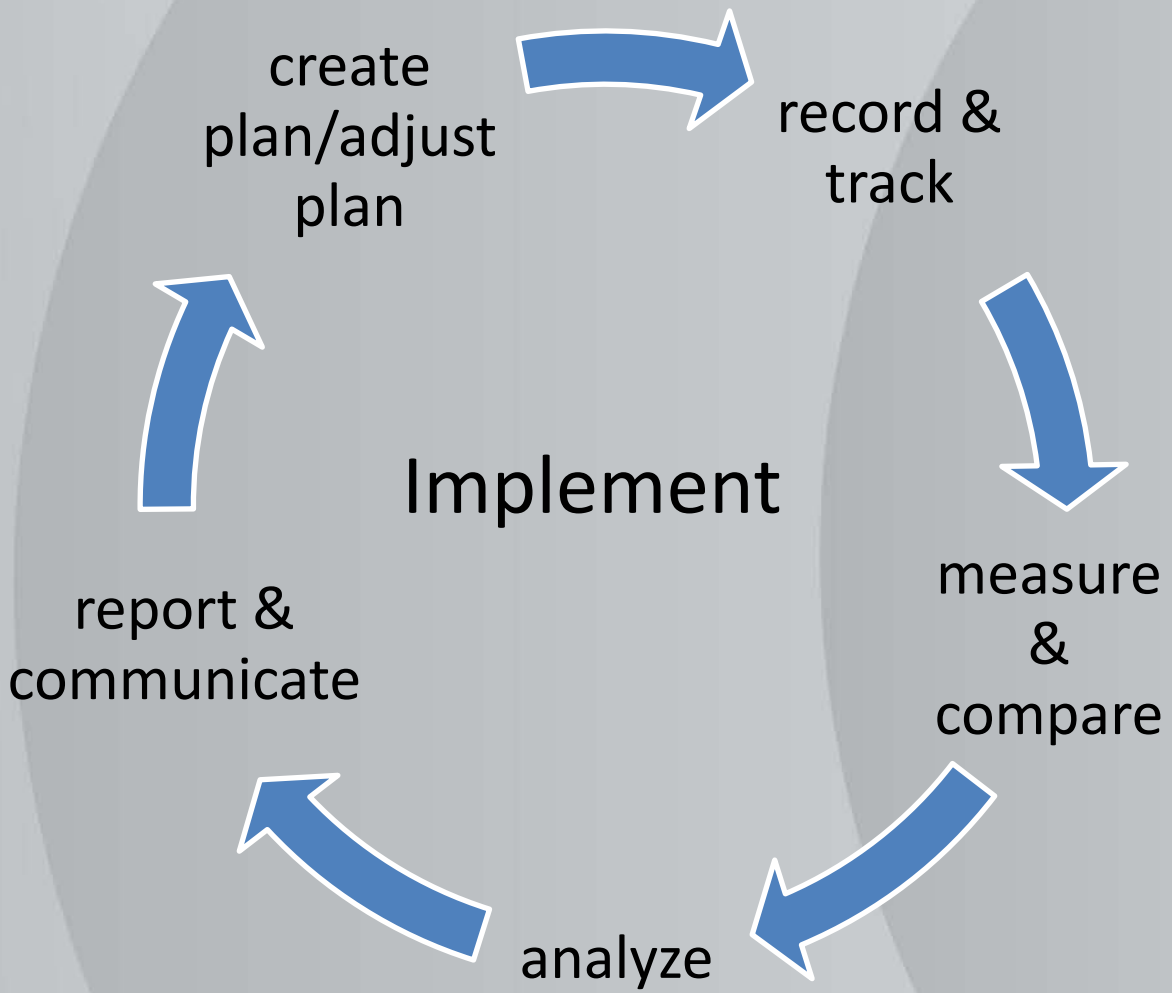
Why Use Resource Accounting?

- **Record, track and monitor**
  - Find billing errors
  - Identify inefficient facilities
  - Troubleshoot abnormal consumption
  - Track cost & usage fluctuations
  - Identify best utility rate schedules



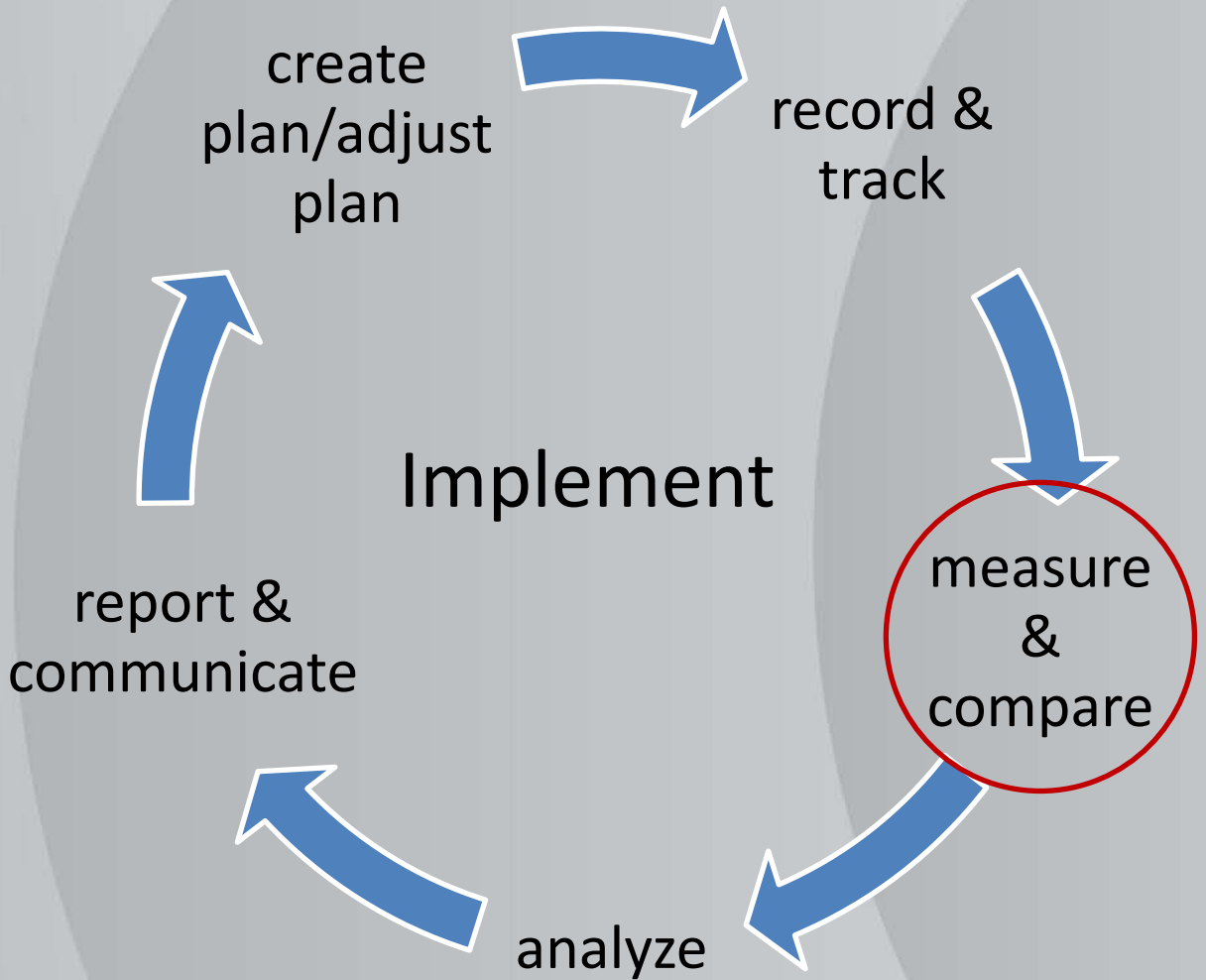
Why Use Resource Accounting?

- Evaluate success & communicate results
- Benchmark facilities & prioritize methods
- Guide & justify capital improvements
- Establish more accurate budgets
- Promote staff awareness & involvement
- Increase accountability


create plan/adjust plan
record & track
measure & compare
analyze
report & communicate
Implement

Record & Track

- **Obtain data**
  - Utility bills (historical and present)
  - Cost and use of other resources
  - Meter numbers & locations
  - Building square footage
  - Occupancy numbers
- **Enter data**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Historical Comparisons

- Present-to-past comparison
- 12 month running average
- Multiple year monthly average
- Current month vs baseline year

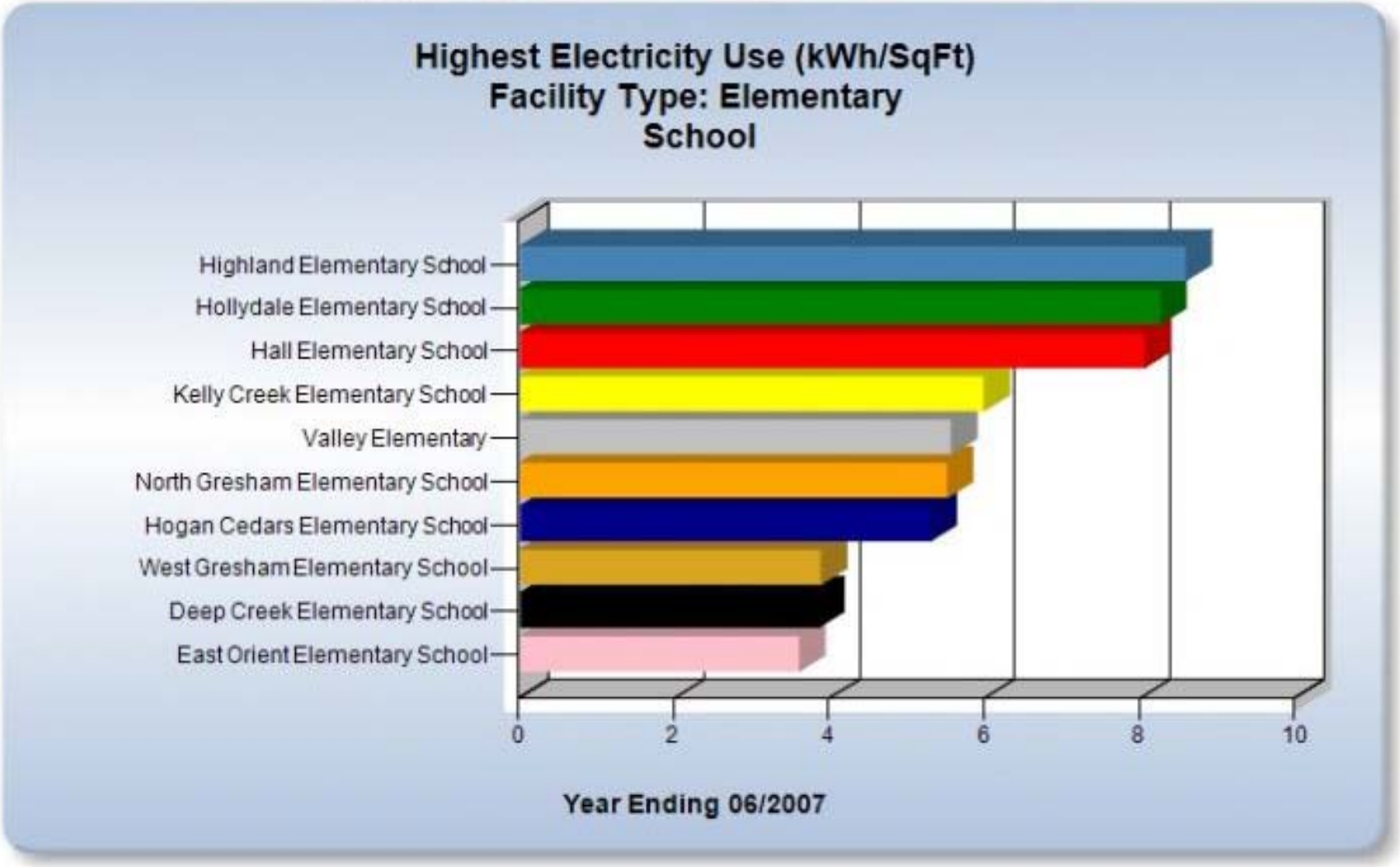
Benchmark Comparisons

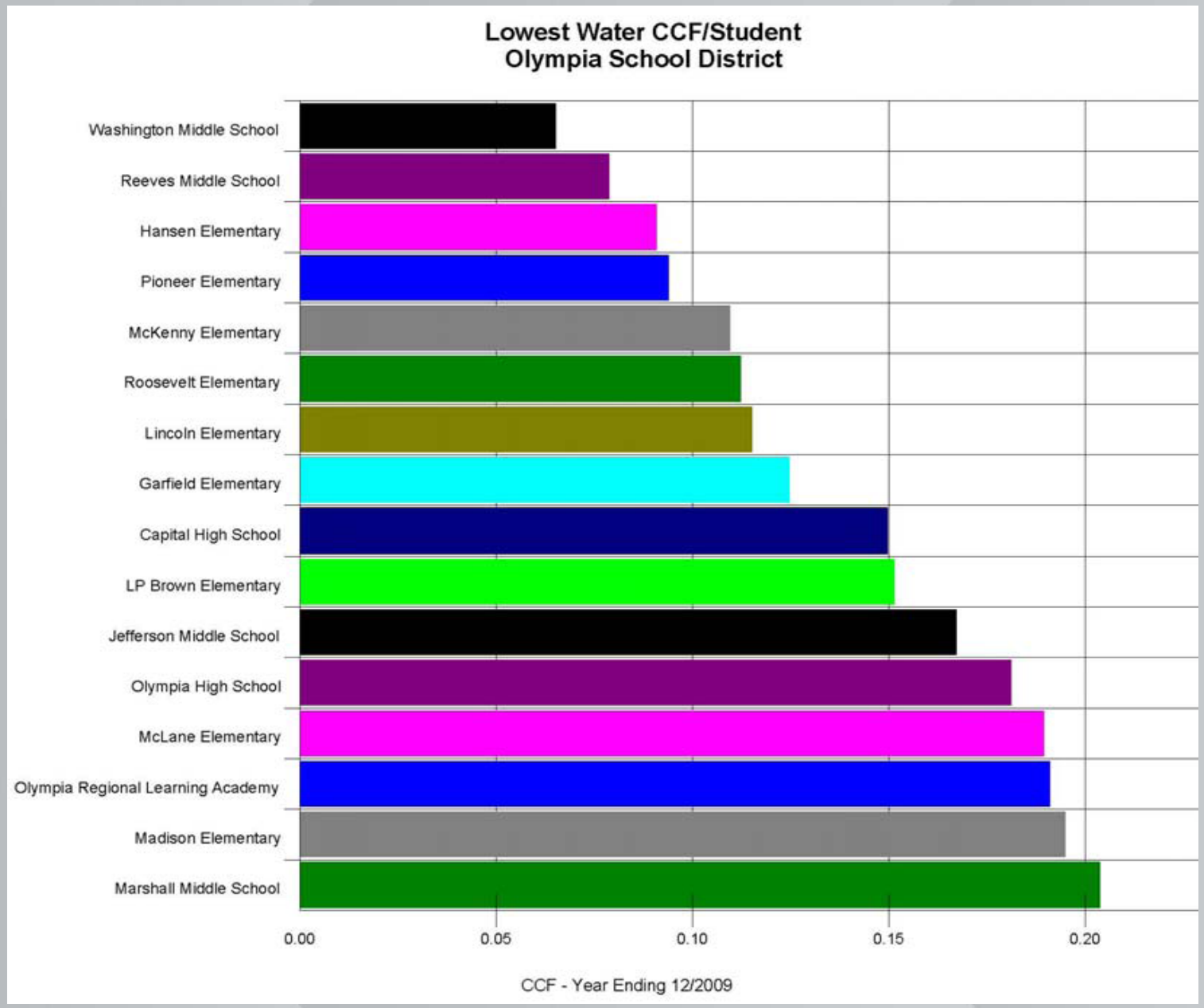
- Facility vs another similar facility
- Facility vs accepted industry benchmarks

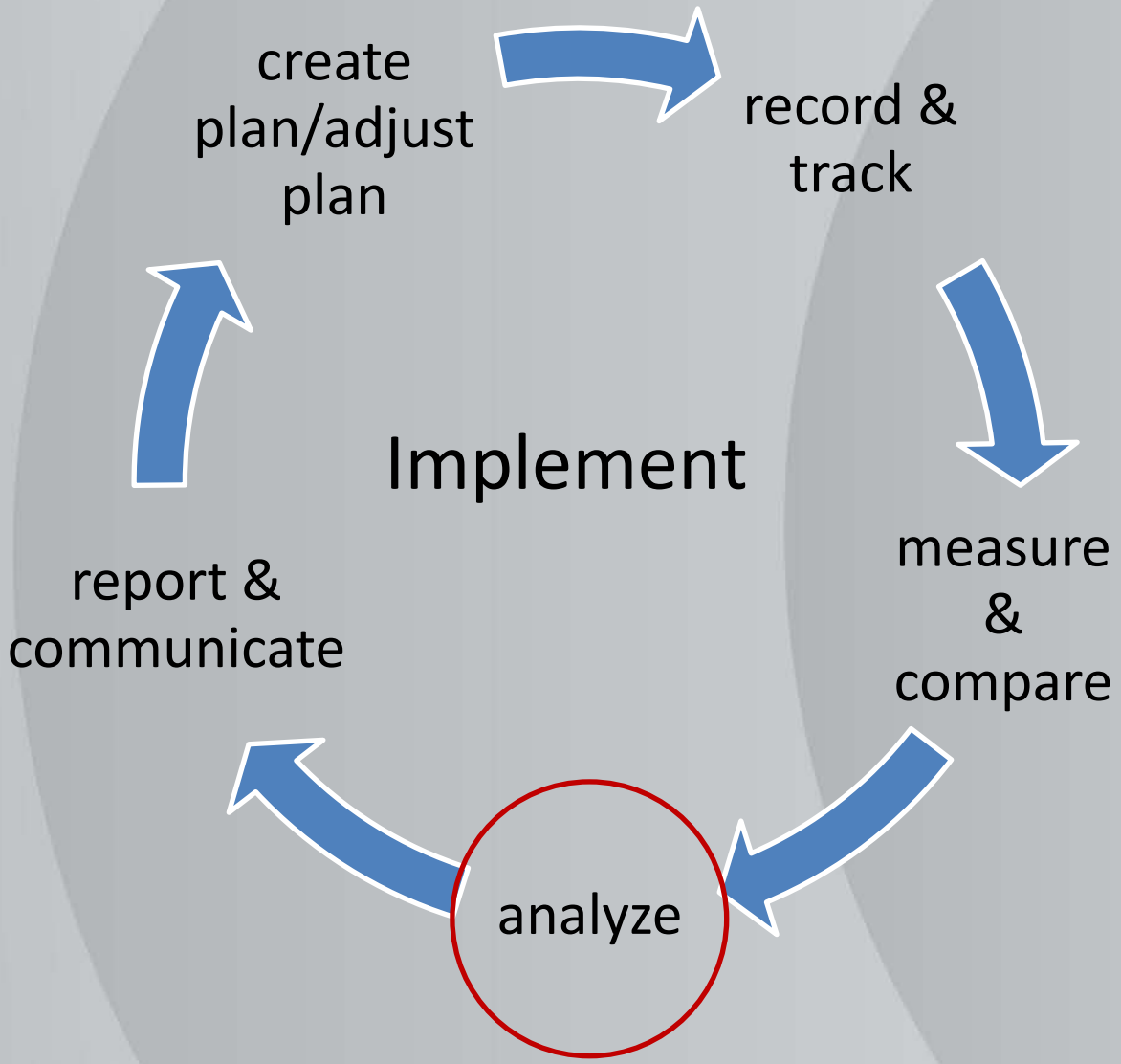
Measurement Units

- Resource unit (therm, kwh, gallon, etc)
- Number of occupants
- Building area
- Unit cost of resource
- Total cost of resource
- Electricity demand

Compare


Highest Electricity Use (kWh/SqFt)
Facility Type: Elementary School
Highland Elementary School
Hollydale Elementary School
Hall Elementary School
Kelly Creek Elementary School
Valley Elementary
North Gresham Elementary School
Hogan Cedars Elementary School
West Gresham Elementary School
Deep Creek Elementary School
East Orient Elementary School
0
2
4
6
8
10
Year Ending 06/2007


Lowest Water CCF/Student
Olympia School District
Washington Middle School
Reeves Middle School
Hansen Elementary
Pioneer Elementary
McKenny Elementary
Roosevelt Elementary
Lincoln Elementary
Garfield Elementary
Capital High School
LP Brown Elementary
Jefferson Middle School
Olympia High School
McLane Elementary
Olympia Regional Learning Academy
Madison Elementary
Marshall Middle School
0.00
0.05
0.10
0.15
0.20
CCF - Year Ending 12/2009


create plan/adjust plan
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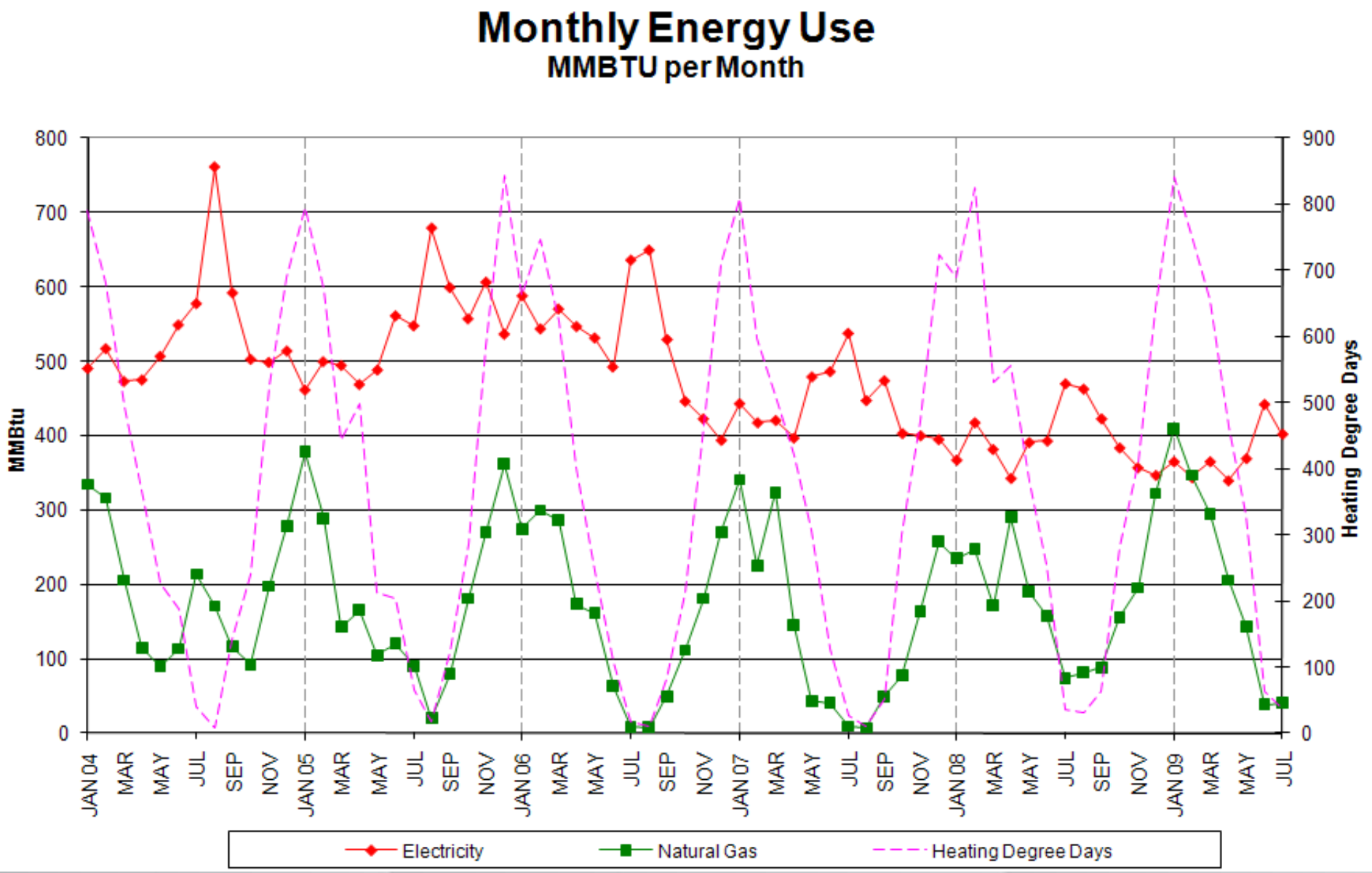
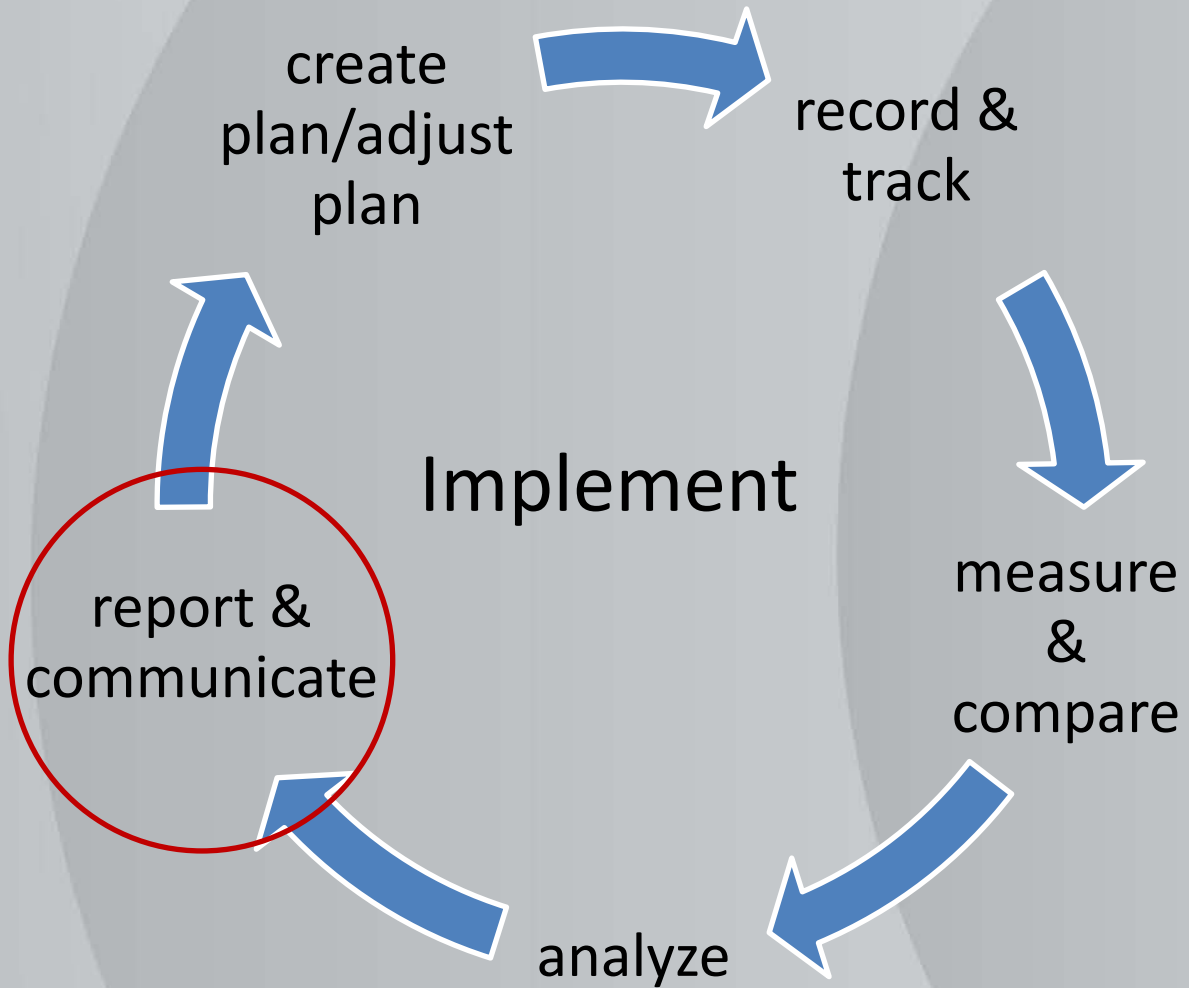
report & communicate
Implement

Analyze


Monthly Energy Use
MMBTU per Month
MMBtu
Heating Degree Days
800
700
600
500
400
300
200
100
0
900
800
700
600
500
400
300
200
100
0
JAN 04
MAR
MAY
JUL
SEP
NOV
JAN 05
MAR
MAY
JUL
SEP
NOV
JAN 06
MAR
MAY
JUL
SEP
NOV
JAN 07
MAR
MAY
JUL
SEP
NOV
JAN 08
MAR
MAY
JUL
SEP
NOV
JAN 09
MAR
MAY
JUL
Electricity
Natural Gas
Heating Degree Days


create plan/adjust plan
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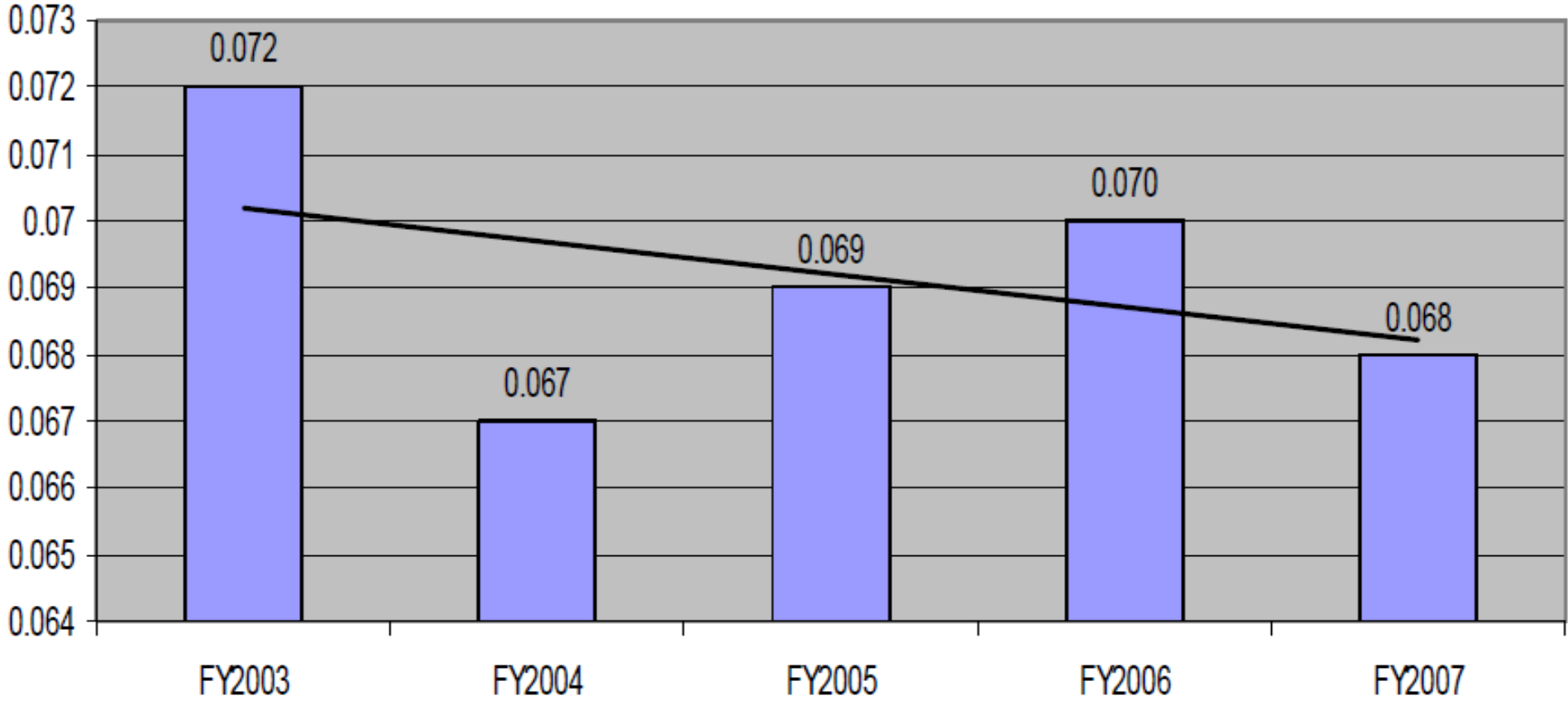
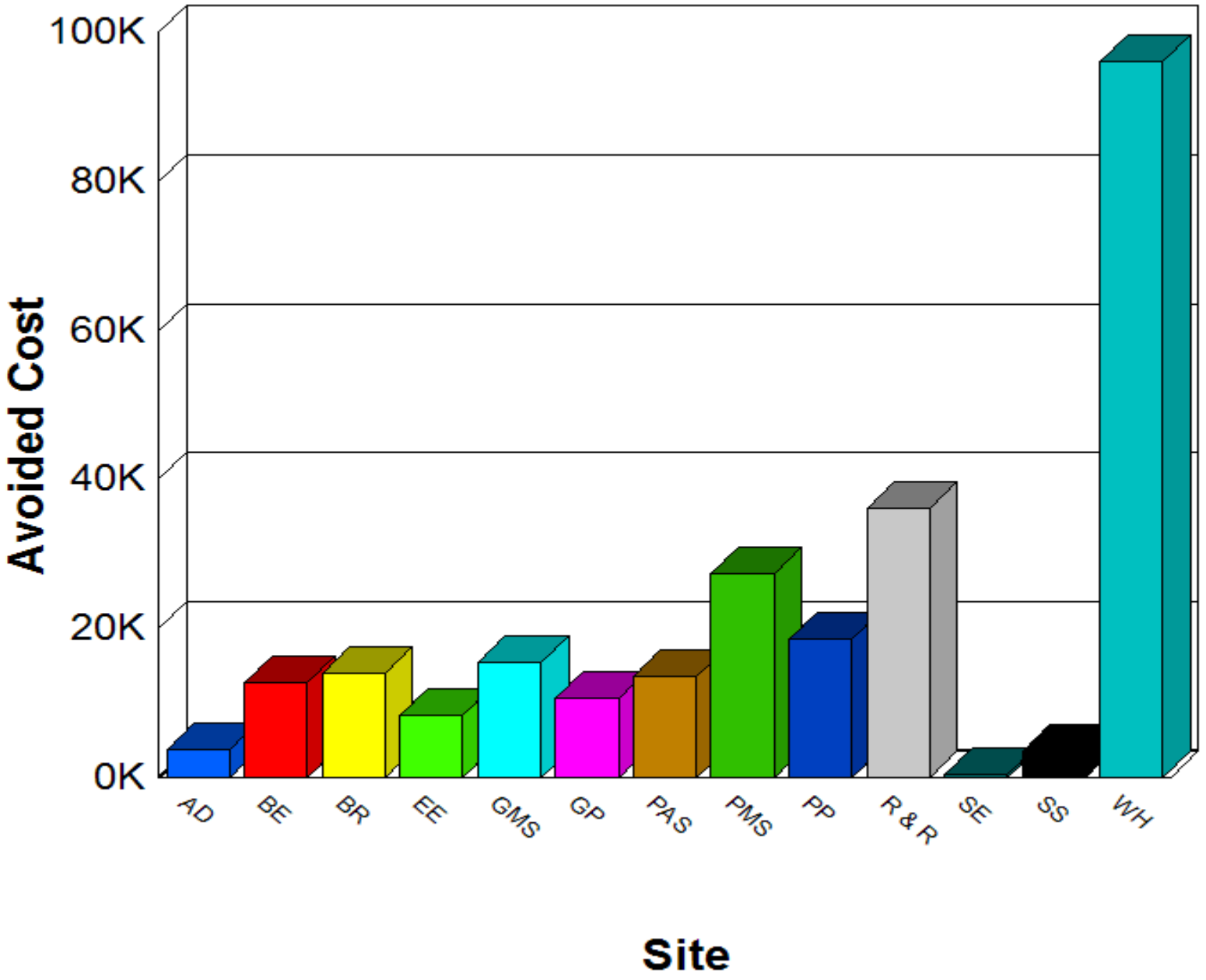
Implement

Report

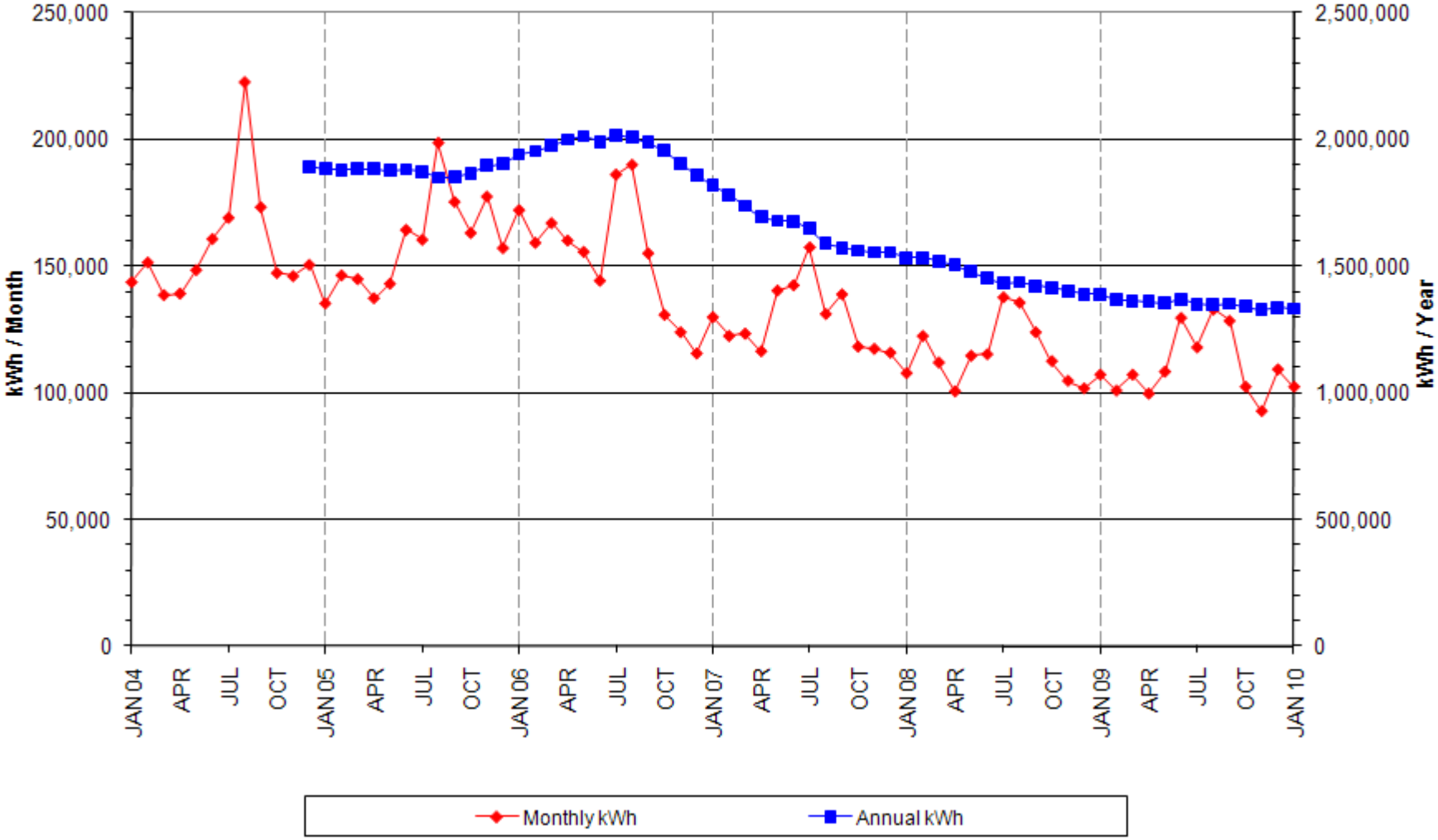
- **Communication**
  - Building operators
  - Building occupants
  - Building managers

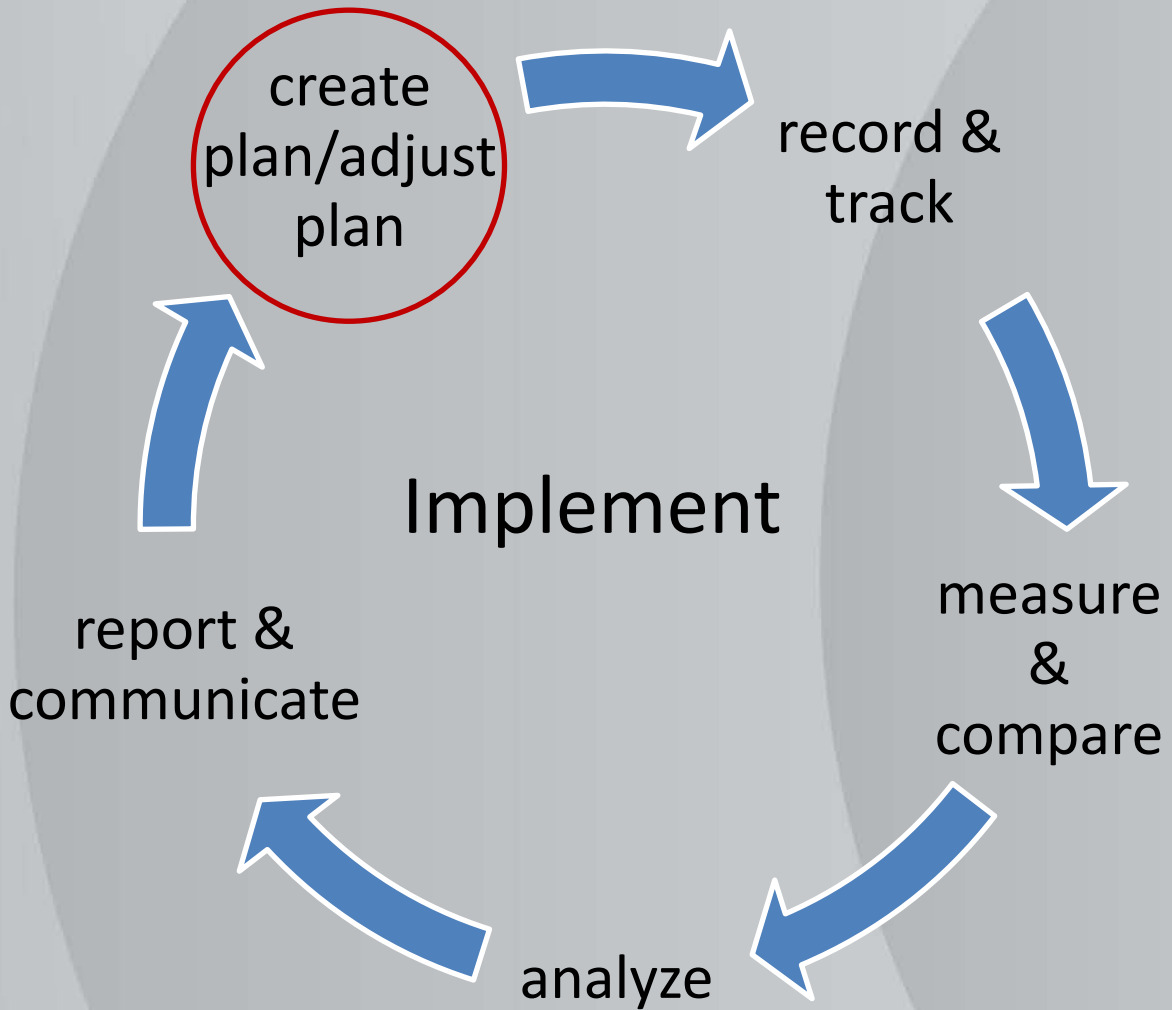
FISCAL YEAR ENERGY USE (MMBTU/SQFT)




100K
80K
60K
40K
20K
0K
Avoided Cost
AD
BE
BR
EE
GMS
GP
PAS
PMS
PP
R & R
SE
SS
WH
Site

Electricity Consumption

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Tools

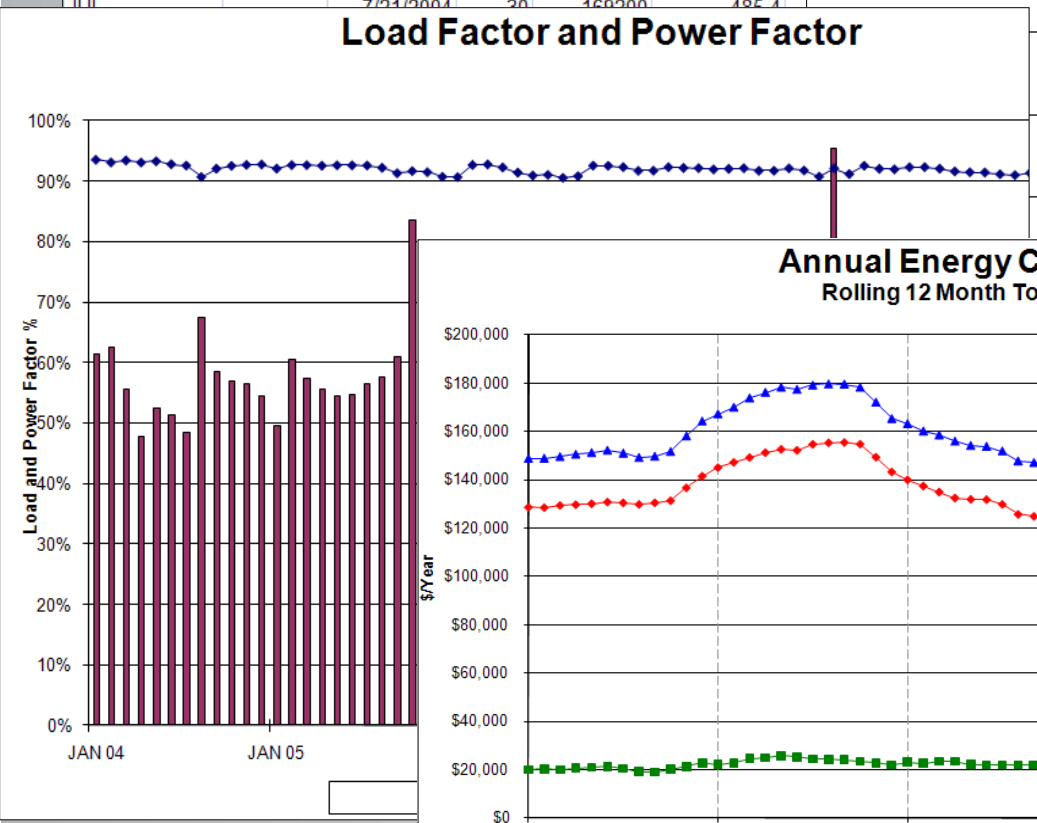
- Manual resource accounting
- Spreadsheet
- Commercial resource accounting software
- Resource accounting service

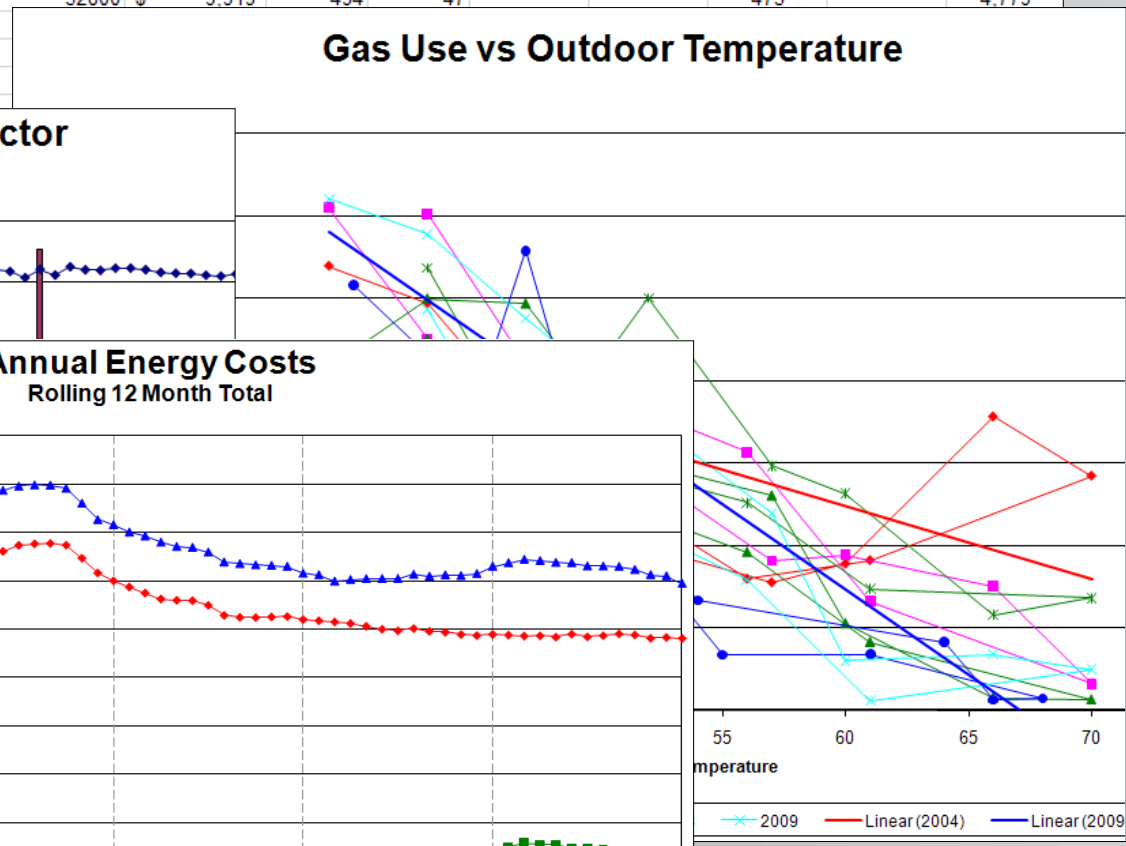
Energy Accounting Worksheet

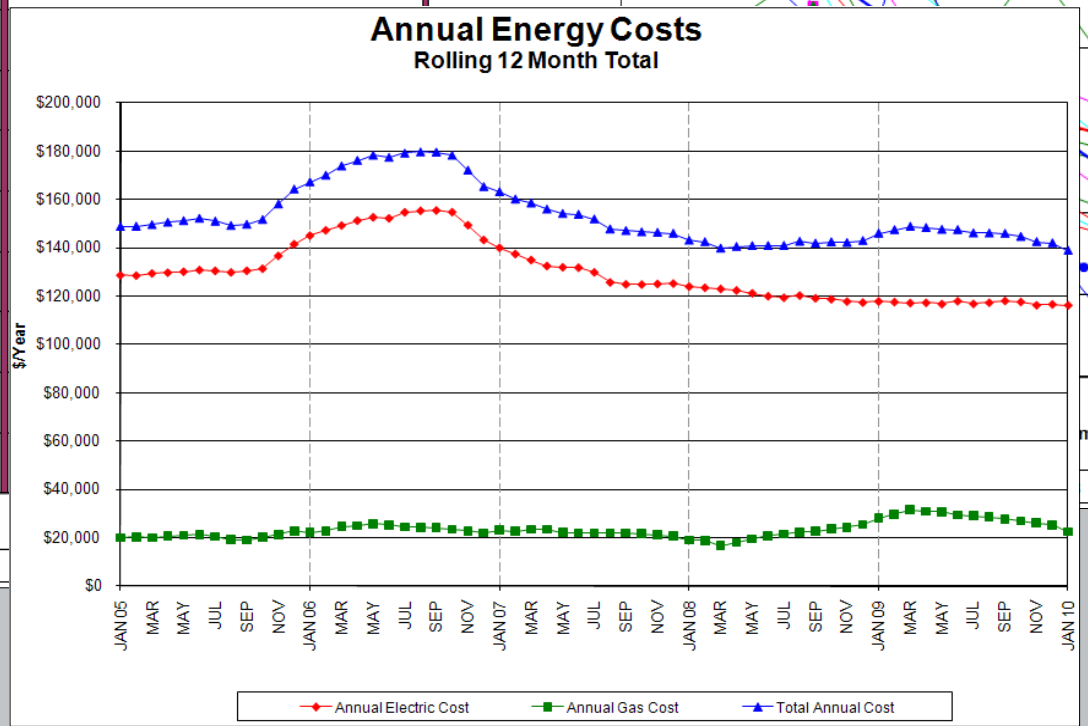
Facility:	Fairfield School		Year:	1995	
Account:	TPY 47 6209		Meter #:	2S5987	
Month	Usage kWh	Demand KW	Cost	Number of Days	Cost/Day
January	53,000	210	$5,013.80	30	$167
February	50,100	195	$4,739.46	29	$163
March	52,300	203	$4,947.58	31	$160
April	49,700	191	$4,701.62	29	$162
May	55,200	245	$5,221.92	31	$168
June	62,800	270	$5,940.88	32	$186
July	71,200	280	$6,735.52	30	$225
August	70,600	284	$6,678.76	30	$223
September	68,000	275	$6,432.80	31	$208
October	53,200	210	$5,032.72	30	$168
November	54,700	198	$5,174.62	29	$178
December	53,900	204	$5,098.94	34	$150
Total	**694,700**		**$65,718.62**	**366**	**$180**

Facility Name	Sample Office			Enter data in yellow cells												
Address	1234 Fifth Avenue															
City, State	BELLEVUE, WA 98004															
Square Footage	80,000	Sq.Ft.		**Current Energy Use Index**		**80,732**	**Btu/Sq.Ft./Year**	This facility								
Elec. Acct #	123-456-789			Benchmark Energy Use Index		80,452	Btu/Sq.Ft./Year	Typical facilities								
Subaccount #	345-678-900			Annual Electricity Use		16.6	kWh/Sq.Ft./Year									
Meter #	Z00987654			Annual Natural Gas Use		0.24	Therms/Sq.Ft./Year									
Elec. Rate ID	26E-C-KV															
Building Type	Office															

Month	Year	To Date	# Days	kWh Usage	kW Demand	kVarh	Electric Cost	Heating Degree Days	Average Daily Temp	Annual kWh	Annual Degree Days	Electric Monthly MMBTU	Electric Annual MMBTU	Electric kWh/ Day
JAN 04	2004	1/22/2004	31	143700	315	54300	$ 9,867	790	39			490		4,635
FEB		2/23/2004	32	151500	315	59400	$ 10,276	680	43			517		4,734
MAR		3/23/2004	29	138600	357.9	52800	$ 9,919	494	47			473		4,779
APR		4/21/2004	29	139200	419.4									
MAY		5/20/2004	29	148500	406.2									
JUN		6/21/2004	32	160800	407.7									

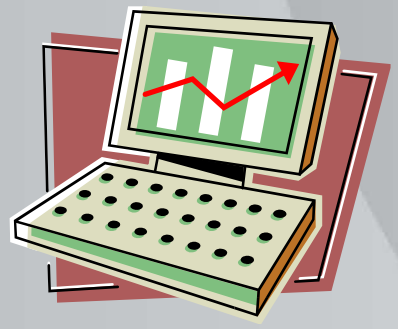






Resource Accounting Software

- **Basic features**:
  - Organization/site records
  - Billing and climate records
  - Reports and graphs
  - User friendliness
  - Documentation and support



Resource Accounting Software

- **Advanced features**
  - Intranet or internet server-based capability
  - Real time metering
  - 15-minute interval data
  - Compare different rate scenarios

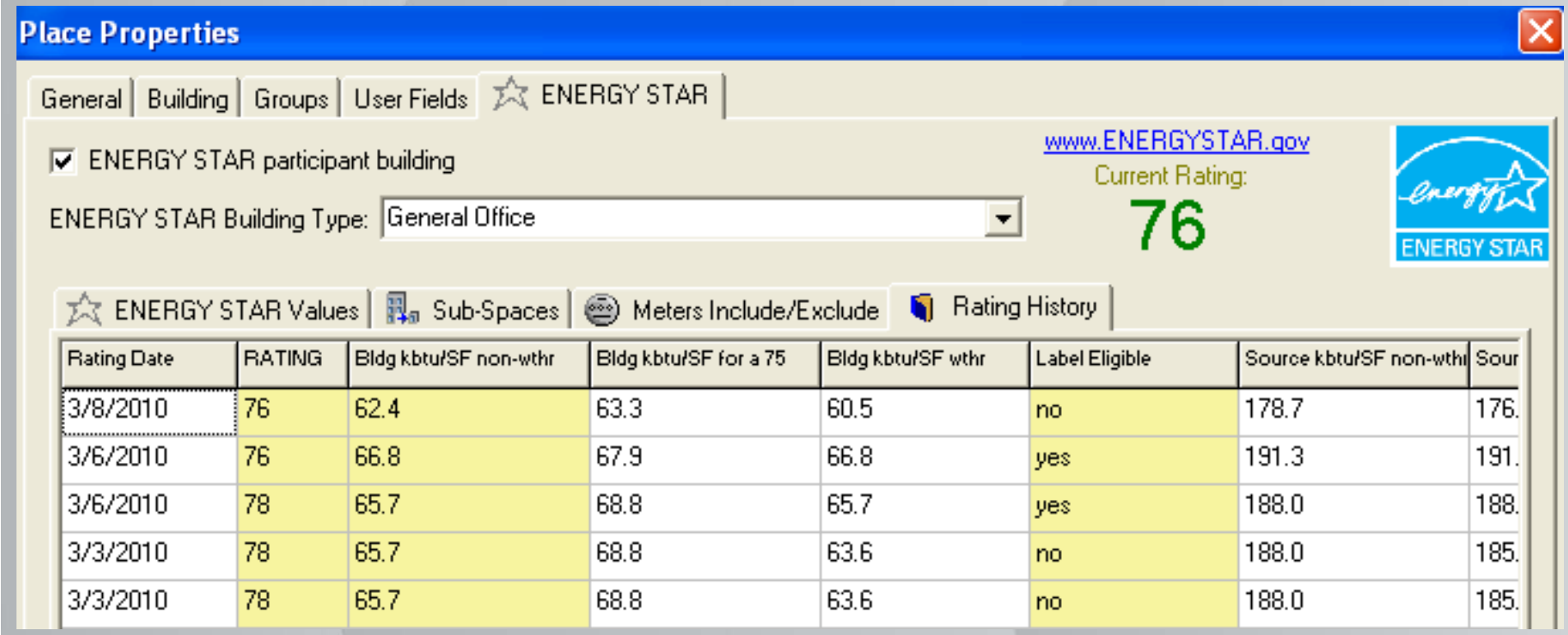
Selecting Resource Accounting Tool

- Who will receive reports
- Who will be entering data
- Can utilities import their data
- How much data to manage
- $ for purchase

Select Software

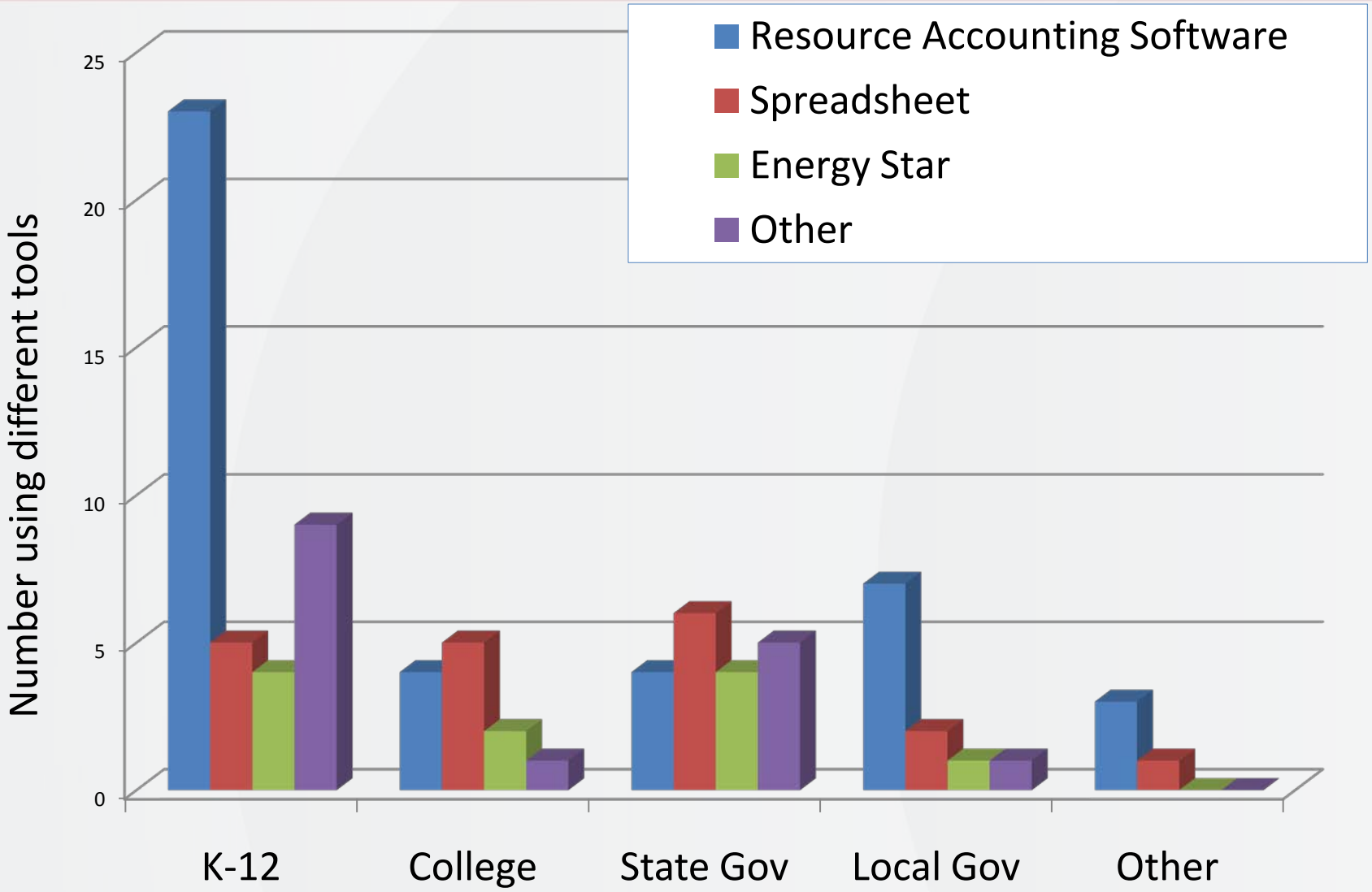
- Examine demos and documentation
- Talk to users
- Understand level of support
- Be aware of initial costs, ongoing costs, and optional features costs

Energy Star



Rating Date	RATING	Bldg kbtu/SF non-wthr	Bldg kbtu/SF for a 75	Bldg kbtu/SF wthr	Label Eligible	Source kbtu/SF non-wthr	Sour
3/8/2010	76	62.4	63.3	60.5	no	178.7	176.
3/6/2010	76	66.8	67.9	66.8	yes	191.3	191.
3/6/2010	78	65.7	68.8	65.7	yes	188.0	188.
3/3/2010	78	65.7	68.8	63.6	no	188.0	185.
3/3/2010	78	65.7	68.8	63.6	no	188.0	185.

GA requirement for state agencies to use Energy Star Portfolio Manager



ind responses	*31*	*6*	*13*	*8*	*4*
tools used	*41*	*12*	*19*	*11*	*4*

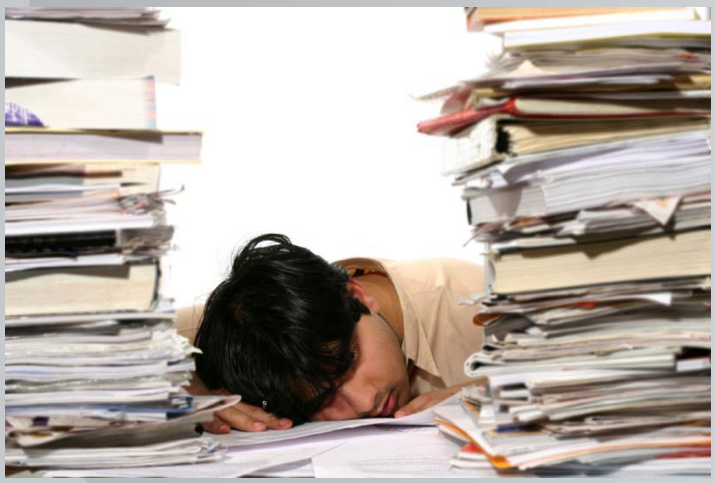
Benefits

- Saves money in operations and maintenance
- Identifies billing errors quickly
- Enables finding problems right away
- Can download data directly from utility (in some cases)
- Reports show trends, good for analyzing data (spreadsheets)
- Benchmarking

Challenges

Resource Accounting Software

- Data entry time and accuracy
- Too many sites/facilities
- Limited report features
- Learning curve
- Need to use other tools



Avoid Biggest Pitfalls

- Lack of staff time and commitment to maintain system
- Failure to communicate results to the right people

Other Thoughts

- Meters and submeters
- Give time to data entry
- Take time to set up database (will save time in the long run)
- Varying practices for billing and rates
- A person must still understand utilities and rate schedules

“Only as useful & accurate as the data you put into it.”

“Data is great, but doesn’t always explain everything.”

"This is a great tool to prove the validity of Resource Conservation. In our district, utilities is the number one cost behind salaries and transportation. It is something that we have control over."

“Have reduced consumption of energy by about 15% or more for last nine years, water by 30%, irrigation by 20%.”

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