

Electric Utility Rates & Data Analysis

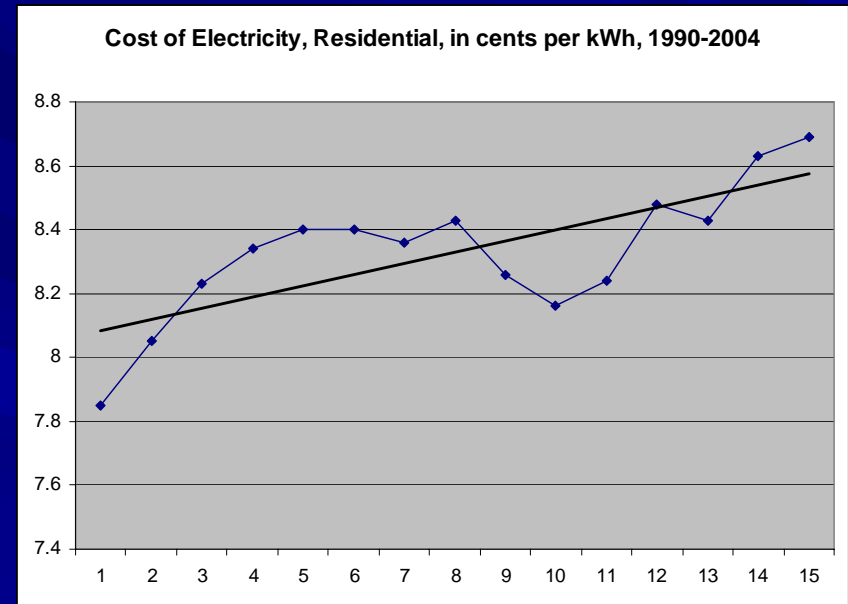
Presented by
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Energy Ace, Inc.

Investments in Energy Efficiency

- Among the Best an Owner can Make
- With Costs Rising, more and more Owners will recognize this
- More Owners will demand Cost/Benefit Analyses
- LCCA the Best Way to Compare Competing Projects
- Critical Inputs - Cost of Energy & Esc Rate

Energy Awareness Back in Style

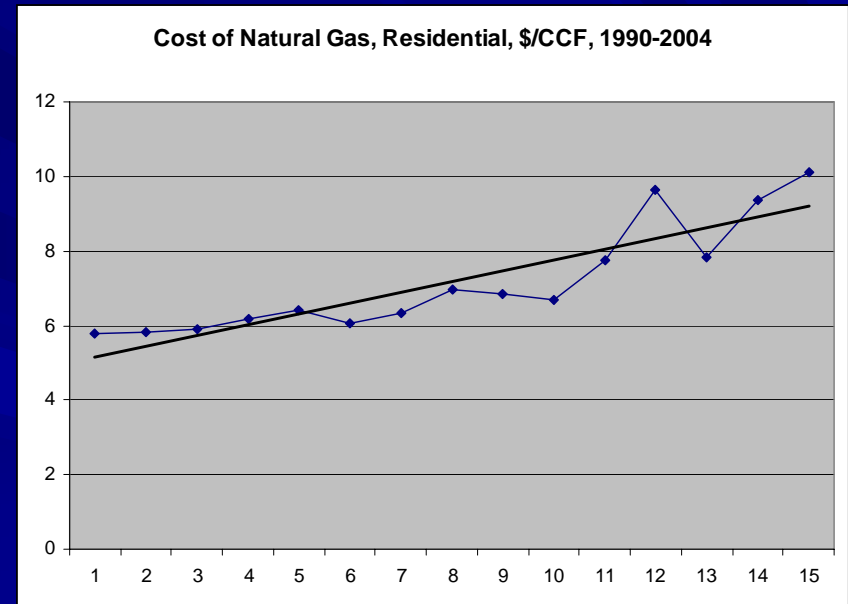
- Energy is largest line item in typical office building's operating budget
- "Electricity costs near 20-year highs" - headline in USA Today in June
- Chart Data from www.eia.doe.gov/emeu/steo/pub/tabshtm.html



Average Compound Interest Rate = 0.68%

Back in Style, Cont'd

- Natural Gas prices at very high levels and likely to remain so, says Fed chairman Alan Greenspan



Average Compound Interest Rate = 3.8%

Cornucopia of Rates

- Rate 1 Residential Service
- Rate 1H Residential Service - Add On Heat Pump Customers
- Rate 1DR Residential Service - Time of Day
- Rate 3 Residential Water Heating Service
- Rate 6 General Service
- Rate 6L Large General Service
- Rate 10 Commercial Water Heating Service
- Rate 14 Residential Service - Space Heating Customers
- Rate 18 Standby Service
- Rate 23 Municipal Street Lighting
- Rate 24 Water-Supply and Sewage Pumping Service
- Rate 25 Street, Highway and Traffic Signal Lighting
- Rate 26 Private Outdoor Lighting
- Rate 87 Governmental Service - Certain Rockford Customers
- Rate ST Short Term Industrial Development Service
- Rate CS Contract Service
- Rate RTP Real Time Pricing (Experimental)
- Rate HEP Hourly Energy Pricing
- Rate IPP Independent Power Producer Service
- Rate RCDS Retail Customer Delivery Service – Nonresidential
- Rate CTC Customer Transition Charge
- Rate PR Partial Requirements Contract Service
- Rate RESS Retail Electric Supplier Service
- Rate MSPS Metering Service Provider Service



Cornucopia of Riders

- Rider 2 Electric Line Extensions
- Rider 3 Qualified Solid Waste Energy Facility Purchases
- Rider 4 Parallel Operation of Customer's Generating Facilities
- Rider 6 Optional or Non-Standard Facilities
- Rider 7 Meter Lease
- Rider 8 Allowance for Customer-Owned Transformers
- Rider 9 Primary Metering
- Rider 11 Service at 69,000 Volts or Higher
- Rider 12 Conditions of Resale or Redistribution of Electricity by the Customer to Third Persons
- Rider 13 Governmental Pumping Service
- Rider 14 Water Heating Service Billing Adjustment
- Rider 16 Franchise Cost Additions
- Rider 19 Industrial Development
- Rider 21 Renewable Energy Resources and Coal Technology Development Assistance Charge and Energy Assistance Charge for the Supplemental
- Rider 23 Municipal and State Tax Additions
- Rider 25 Electric Space Heating.
- Rider 26 Interruptible Service.
- Rider 27 Displacement of Self-Generation
- Rider 28 Local Government Compliance Clause
- Rider 30 Interruptible/Curtailable Service
- Rider 31 Decommissioning Expense Adjustment Clause
- Rider 32 Curtailable Service Cooperative
- Rider AC Residential Air Conditioner Load Cycling Program
- Rider CB Consolidated Billing (Experimental)
- Rider FACR94 1994 FAC Reconciliation
- Rider FACR96 1996 FAC Reconciliation
- Rider FCR Fuel Cost Refund
- Rider GCB Governmental Consolidated Billing
- Rider IFC Instrument Funding Charge
- Rider ISS Interim Supply Service
- Rider PPO Power Purchase Option – Market Index
- Rider SBO Single Bill Option
- Rider TS Transmission Services
- Rider VRS Voluntary Resource Sharing
- Low-Income Energy Assistance Fund

Typical Power & Light Schedule Components

- Service Charge (usually a fixed charge)
- Energy Charge (per unit, kWh)
- Demand Charge (per kW, actual or “billed”)
- Power or Fuel Cost Adjustment (usually per unit, kWh)
- Power Factor Charge
- Sales Tax

Sample Power & Light Rate

MONTHLY RATE

- *I. Basic Customer Charge: \$500.00*
- *II. kW Demand Charge:*
 - *\$11.25 per kW for the first 5,000 kW of Billing Demand*
 - *\$10.25 per kW for the next 5,000 kW of Billing Demand*
 - *\$ 9.25 per kW for all over 10,000 kW of Billing Demand*
- *III. kWh Energy Charge: 3.629¢ per kWh*

Sample Electric Bill One Months' Data

ABC Building, Atlanta, GA

Master Summary Bill:

Invoice Date: 09/04/2002

Please Pay By: 09/18/2002

SEQ 00 Account # 000 Account Access Code: DBA Account ID

Service Period: 07/28/2002 to 08/26/2002

Metering and Usage

Meter

Billing Rate: PLL - Power and Light Large

Reading Type	Prev	Pres	Const	Usage
Pk-KVAR			1	850.5
Tot KWh	0	0	1	1031877.65
Pk kW			1	1672.2
Onpk kW			1	1672.2
Offpk kW			1	1384.4
SB Demand				1750

Historical Data

	Days	KWH	KWH / Day	Cost	Cost / Day
This Mth	32	1031878	32240	48917.50	1528.67
Last Mth	30	972355	32412	47422.38	1580.74

Contract Agreements

PLL - Power and Light Large:

Contract Demand

Contract Demand: 3500

Off-Peak Rider

Explanation of Charges

PLL - Power and Light Large:

Current Service

\$48,917.50

Sales Tax

Current Amount

\$48,917.50

Previous Balance

\$0.00

Total Amount Due

\$48,917.50

Two Years' Data

ABC Bldg., Atlanta, GA

Account Contact: Reddy Kilowatt
Customer Primary Contact: Irma Lert

Electrical Use Summary

Account, Billing Information View

Display: Basic Information

Time Period: 24 Months

Account:

Rate: PLL

Month	Meter Read	Billing Days	Total kWh	Peak kW Demand	Electric Service Total	Average Cost
January '01	01/25/01	34	1,257,152	2,117	\$54,827	4.35¢
February '01	02/23/01	29	1,032,585	2,121	\$49,488	4.79¢
March '01	03/26/01	31	1,173,139	2,273	\$52,896	4.49¢
April '01	04/25/01	30	1,054,004	1,884	\$50,038	4.75¢
May '01	05/24/01	29	1,055,887	1,850	\$50,066	4.74¢
June '01	06/25/01	32	1,106,580	1,965	\$54,268	4.90¢
July '01	07/25/01	30	1,008,725	1,813	\$44,273	4.39¢
August '01	08/24/01	30	1,026,022	1,751	\$51,091	4.98¢
September '01	09/25/01	32	1,009,120	1,742	\$50,553	5.02¢
October '01	10/24/01	29	919,023	1,854	\$48,347	5.26¢
November '01	11/26/01	33	1,201,173	1,929	\$55,305	4.60¢
December '01	12/26/01	30	1,007,939	1,860	\$50,586	5.02¢
January '02	01/25/02	30	1,052,093	2,003	\$50,845	4.83¢
February '02	02/25/02	31	1,127,816	2,025	\$52,864	4.66¢
March '02	03/26/02	29	1,023,655	2,085	\$49,941	4.88¢
April '02	04/24/02	29	996,870	1,777	\$49,295	4.94¢
May '02	05/24/02	30	981,880	1,732	\$48,925	4.98¢
June '02	06/25/02	32	1,012,901	1,712	\$48,436	4.78¢
July '02	07/25/02	30	972,355	1,686	\$47,422	4.88¢
August '02	08/26/02	32	1,031,678	1,672	\$48,918	4.74¢
September '02	09/25/02	30	962,806	1,674	\$47,186	4.90¢
October '02	10/24/02	29	912,519	1,832	\$45,945	5.03¢
November '02	11/22/02	29	992,457	1,903	\$47,911	4.83¢
December '02	12/26/02	34	1,199,436	2,080	\$52,715	4.39¢
Total		734	25,117,635		\$1,201,541	
Peak		34	1,257,152	2,273	\$55,305	5.26¢
Average		31	1,046,568	1,889	\$50,064.21	4.78¢

More of Two Years' Data

ABC Building, Atlanta, GA

Account Contact: Roddy Kilowatt
Customer Primary Contact: Ina Lett

Electrical Use Summary

Account, Billing Information View

Display: Technical Information

Time Period: 24 Months

Account:

Rate: PLL

Month	Peak kW Demand	Bill Demand	HUD	Load Factor	Excess Reactive	Electric Service Total
January '01	2,117	1,750	594	73%	131	\$54,627
February '01	2,121	1,750	487	70%	175	\$49,488
March '01	2,273	1,750	516	69%	90	\$52,696
April '01	1,884	1,750	559	78%	269	\$50,038
May '01	1,850	1,750	571	82%	264	\$50,066
June '01	1,965	1,866	583	73%	401	\$54,268
July '01	1,813	1,866	556	77%	313	\$44,273
August '01	1,751	1,866	586	81%	355	\$51,091
September '01	1,742	1,866	579	75%	321	\$50,653
October '01	1,854	1,866	496	71%	245	\$48,347
November '01	1,929	1,866	623	79%	203	\$55,305
December '01	1,860	1,866	542	75%	177	\$50,586
January '02	2,003	1,866	525	73%	129	\$50,845
February '02	2,025	1,866	557	75%	150	\$52,564
March '02	2,085	1,866	491	71%	112	\$49,941
April '02	1,777	1,866	561	81%	210	\$49,295
May '02	1,732	1,866	567	79%	235	\$48,925
June '02	1,712	1,750	582	77%	257	\$48,436
July '02	1,686	1,750	577	80%	274	\$47,422
August '02	1,672	1,750	617	80%	293	\$48,918
September '02	1,674	1,750	575	80%	286	\$47,188
October '02	1,832	1,750	498	72%	367	\$45,945
November '02	1,903	1,750	522	75%	213	\$47,911
December '02	2,080	1,750	577	71%	12	\$52,715
Total						\$1,201,541
Peak	2,273	1,965	623	82%	401	\$55,305
Average	1,889	1,812			228	\$50,064.21

Better Way to View Data Table Form, 2001

Date	Peak kW Demand	Bill Demand	Total kWh	Electric Service Total
Jan-01	2,117	1,750	1,257,152	\$54,627
Feb-01	2,121	1,750	1,032,585	\$49,488
Mar-01	2,273	1,750	1,173,139	\$52,696
Apr-01	1,884	1,750	1,054,004	\$50,038
May-01	1,850	1,750	1,055,697	\$50,066
Jun-01	1,965	1,965	1,106,580	\$54,268
Jul-01	1,813	1,866	1,008,725	\$44,273
Aug-01	1,751	1,866	1,026,022	\$51,091
Sep-01	1,742	1,866	1,009,120	\$50,653
Oct-01	1,854	1,866	919,023	\$48,347
Nov-01	1,929	1,866	1,201,173	\$55,305
Dec-01	1,860	1,866	1,007,939	\$50,586

Table Form, 2002

Date	Peak kW Demand	Bill Demand	Total kWh	Electric Service Total
Jan-02	2,003	1,866	1,052,093	\$50,845
Feb-02	2,025	1,866	1,127,816	\$52,564
Mar-02	2,085	1,866	1,023,655	\$49,941
Apr-02	1,777	1,866	996,870	\$49,295
May-02	1,732	1,866	981,880	\$48,925
Jun-02	1,712	1,750	1,012,901	\$48,436
Jul-02	1,686	1,750	972,355	\$47,422
Aug-02	1,672	1,750	1,031,678	\$48,918
Sep-02	1,674	1,750	962,806	\$47,186
Oct-02	1,832	1,750	912,519	\$45,945
Nov-02	1,903	1,750	992,467	\$47,911
Dec-02	2,080	1,750	1,199,436	\$52,715

Chart View, ABC Building

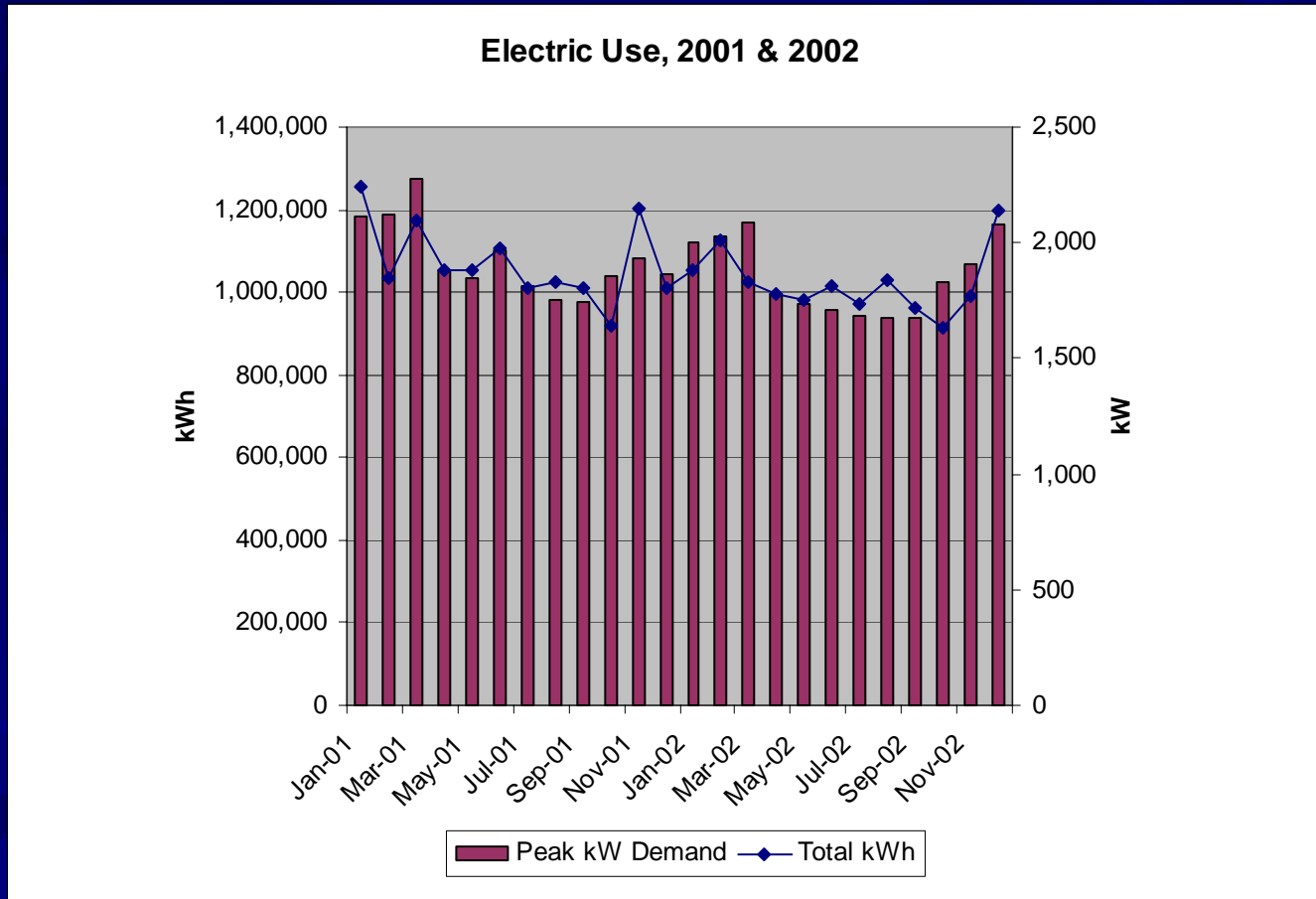
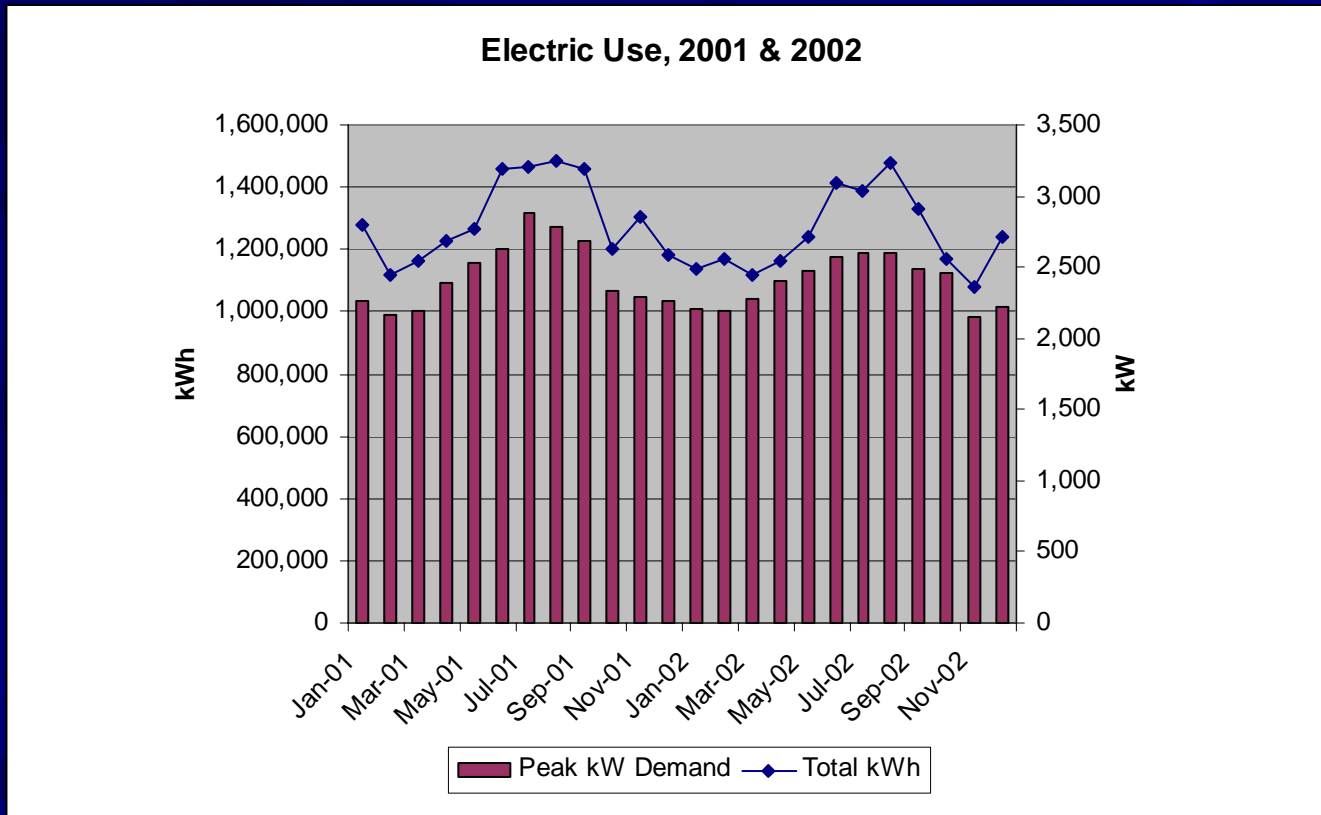
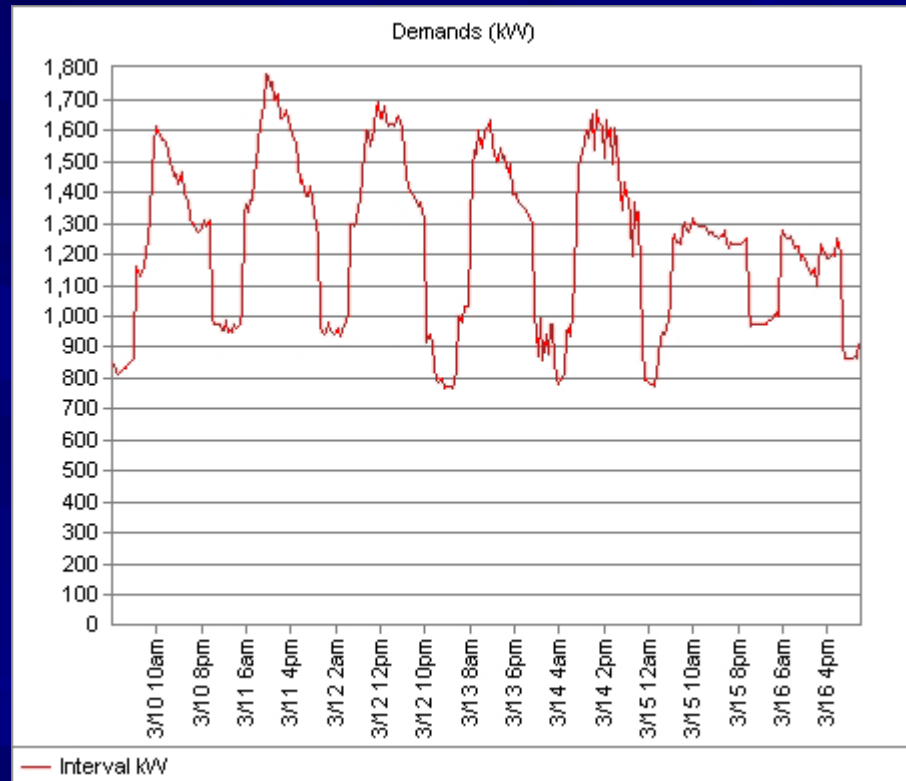


Chart View, XYZ Building

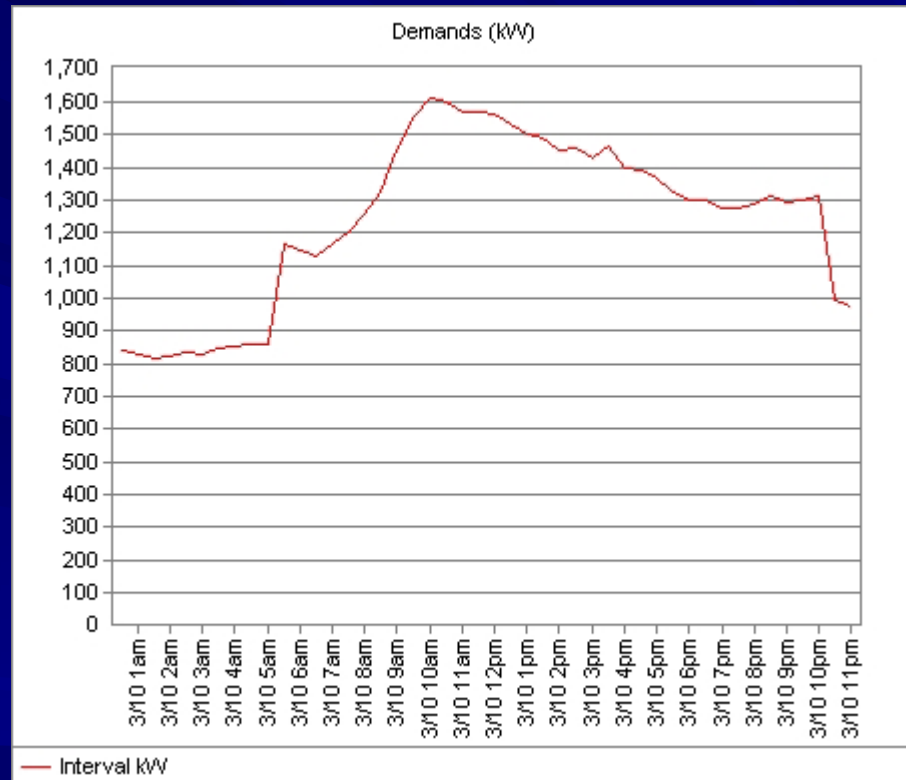


Data Behind the Data

Interval Data, Typical Week



Interval Data, Typical Day



Two Common Mistakes

- Mistaking Peak Demand for Bill Demand
- Using Average Costs in Energy Computations



The Ratchet

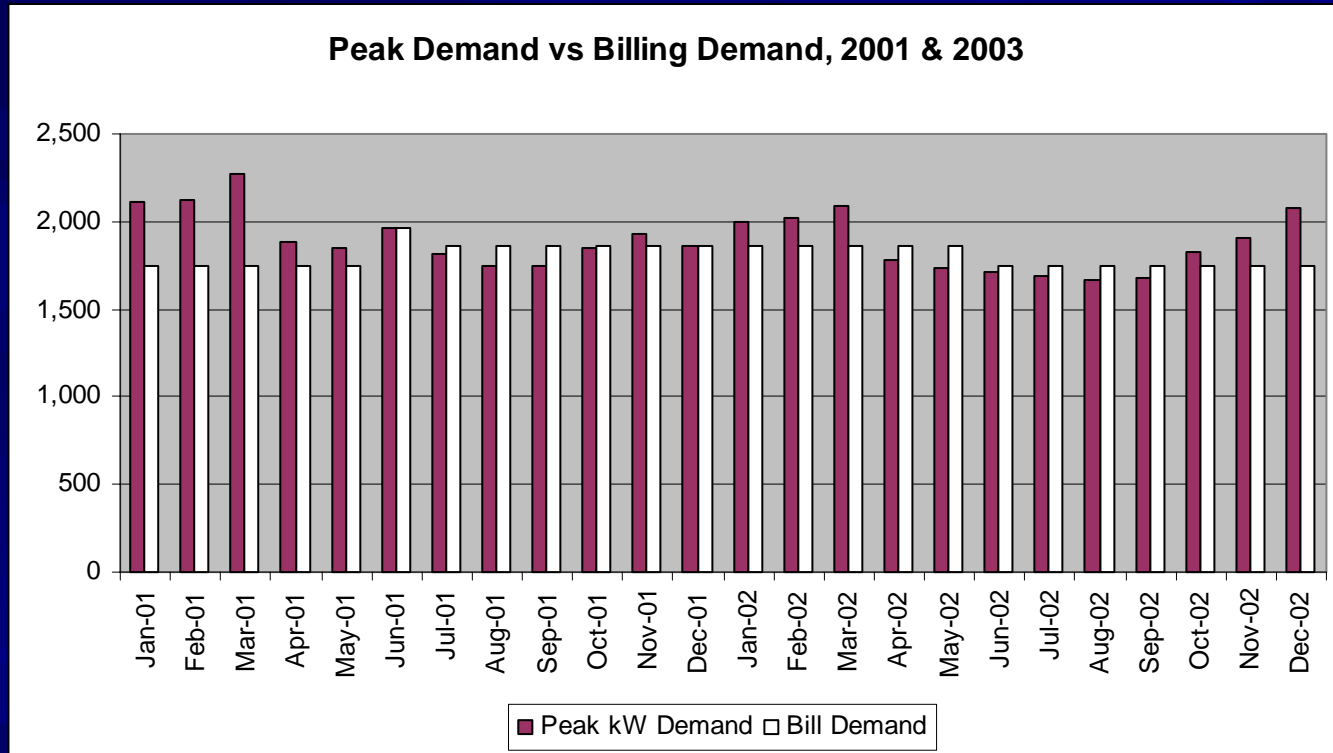
Bill Demand vs. Peak Demand

- A clause that computes a “billing demand” which is a percentage of the highest KW demand of the preceding 11 months.
- Example – *“The Billing Demand shall be the maximum kW registered or computed, by or from Company's metering facilities, during any 15-minute interval within the current billing month. However, the Billing Demand shall not be less than the greater of: (1) 80% of the maximum monthly 15-minute demand during the billing months of July through October of the preceding 11 billing months, or (2) 60% of the maximum monthly 15-minute demand during the billing months of November through June of the preceding 11 billing months, or (3) 75% of the Contract Demand until such time as the Billing Demand first equals or exceeds the effective Contract Demand, or (4) 1,000 kW.”*

Another Example of The Ratchet

- *“The Billing Demand shall be based on the highest 30-minute kW measurement during the current month and the preceding eleven (11) months.*
- *For the billing months of June through September, the Billing Demand shall be the greatest of:*
 - *(1) The current actual demand, or,*
 - *(2) Ninety-Five percent (95%) of the highest actual demand occurring in any previous applicable summer month (June through September), or,*
 - *(3) Sixty percent (60%) of the highest actual demand occurring in any previous applicable winter month (October through May).*
- *For the billing months of October through May, the Billing Demand shall be the greater of:*
 - *(1) Ninety-Five percent (95%) of the highest summer month (June through September), or,*
 - *(2) Sixty percent (60%) of the highest winter month (October through May), including the current month.*
 - *In no case shall the Billing Demand be less than the greatest of:*
 - *(1) The contract minimum, or, (2) Fifty percent (50%) of the total contract capacity, or, (3) 500 kW.”*

Illustration of Bill Demand in Action



Average Costs vs. Marginal Costs

- For the ABC Building the Average Cost/kWh of electricity is 4.8 cents
- This value is easily computed and easily (mis)used.
- One Electric Utility routinely provides Average Cost information to its customers
- Why is it wrong? Because most large rate tariffs are “declining block” schedules – the more you use, the less you pay

Average Costs vs. Marginal Costs

- In the ABC Building the Marginal Cost/kWh of electricity is 2.5 cents
- This value is not so easily computed and often not used or not understood.
- Use of Average Costs results in overstatement of savings
- A project that shows a 3 year payback using avg costs actually has nearly a six year payback



Estimating Marginal Costs

- Sometimes Straightforward – Sample Rate
 - I. Basic Customer Charge: \$500.00
 - II. kW Demand Charge:
 - \$11.25 per kW for the first 5,000 kW of Billing Demand
 - \$10.25 per kW for the next 5,000 kW of Billing Demand
 - \$ 9.25 per kW for all over 10,000 kW of Billing Demand
 - III. kWh Energy Charge: 3.629¢ per kWh
- To the Energy Charge add any other costs that vary with consumption – e.g., sales tax, fuel cost recovery factors
- Engineering judgment required to decide if demand is affected.

Estimating Marginal Costs

- Sometimes obscure
- Excerpt from a Sample Rate:
 - All consumption (kWh) not greater than 200 hours times the billing demand:
 - First 3,000 kWh 10.099¢ per kWh
 - Next 7,000 kWh 9.186¢ per kWh
 - Next 190,000 kWh 7.860¢ per kWh
 - Over 200,000 kWh..... 6.096¢ per kWh
 - All consumption (kWh) in excess of 200 hours and not greater than 400 hours times the billing demand 1.040¢ per kWh
 - All consumption (kWh) in excess of 400 hours and not greater than 600 hours times the billing demand 0.822¢ per kWh
 - All consumption (kWh) in excess of 600 hours times the billing demand 0.594¢ per kWh
- Derive marginal costs by performing a complete computation, then rerun using a lower kWh consumption value.

Analyzing Electric Utility Rates

- Can be a Tricky Business
- Can be a Rewarding One
- Understanding Electric Rate Schedules – Dull but Profitable
- Work Closely with your Electric Utility Rep to identify rate options, riders and alternatives
- Discuss plant-side changes; solicit their advice
- Good Hunting

