CNN Center's ENERGY PROGRAM

Past Success and Future Plans

Turner
A TimeWarner Company

John Hester, PE, CEM
Turner Properties, Inc.

From 1995 to 2009

How did CNN Center...

Increase energy 75%

Increase utility costs 175%

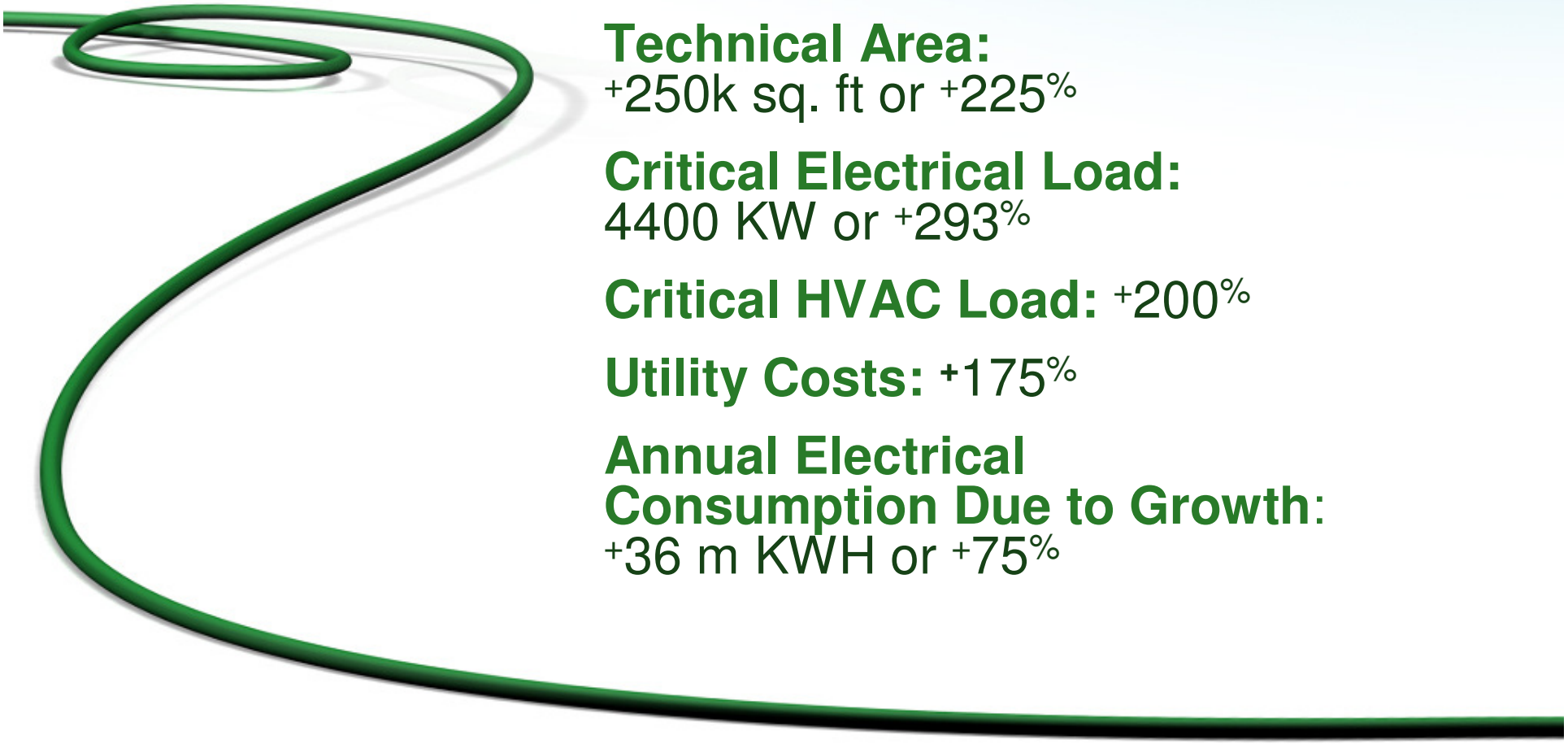
...and still win an energy award?

Networks Broadcasting from CNNC in 1995

Growth at CNN Center

Networks Broadcasting from CNNC in 2009

Growth at CNN Center 1996–2008



New Networks:
16 (5 in 1995)

Technical Area:
+250k sq. ft or +225%

Critical Electrical Load:
4400 KW or +293%

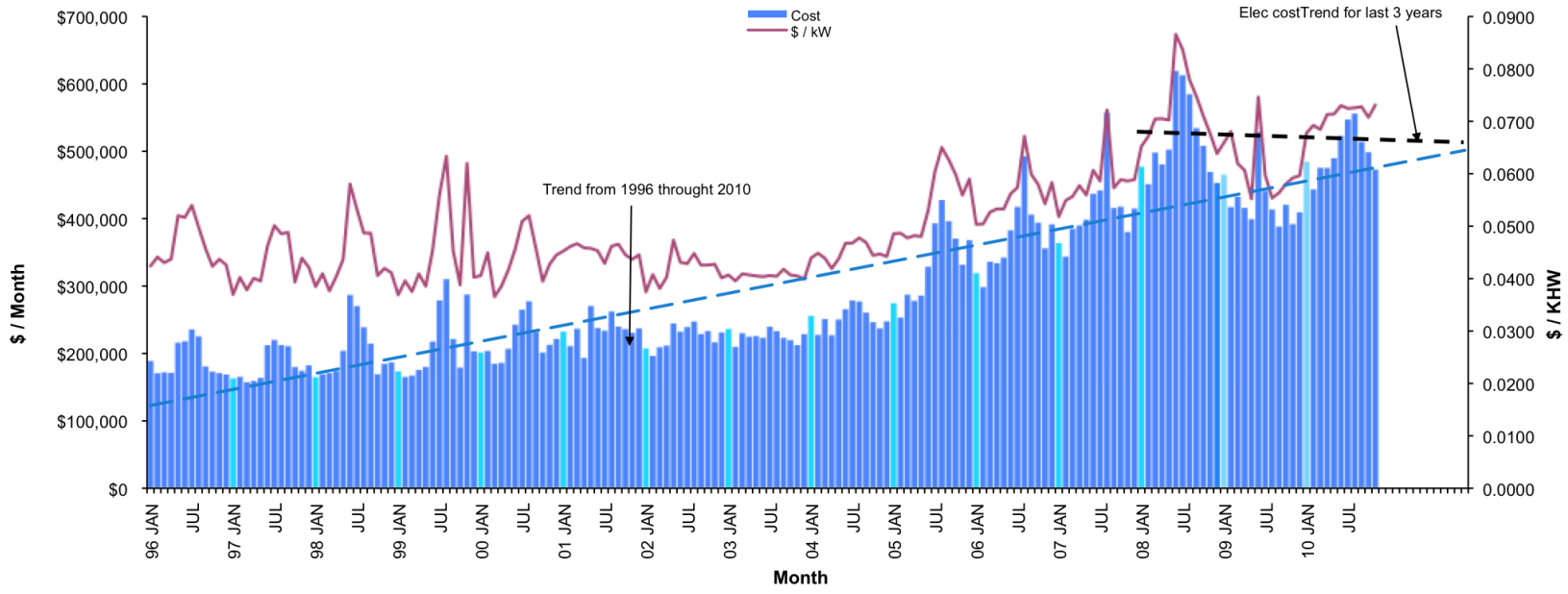
Critical HVAC Load: +200%

Utility Costs: +175%

Annual Electrical Consumption Due to Growth:
+36 m KWH or +75%

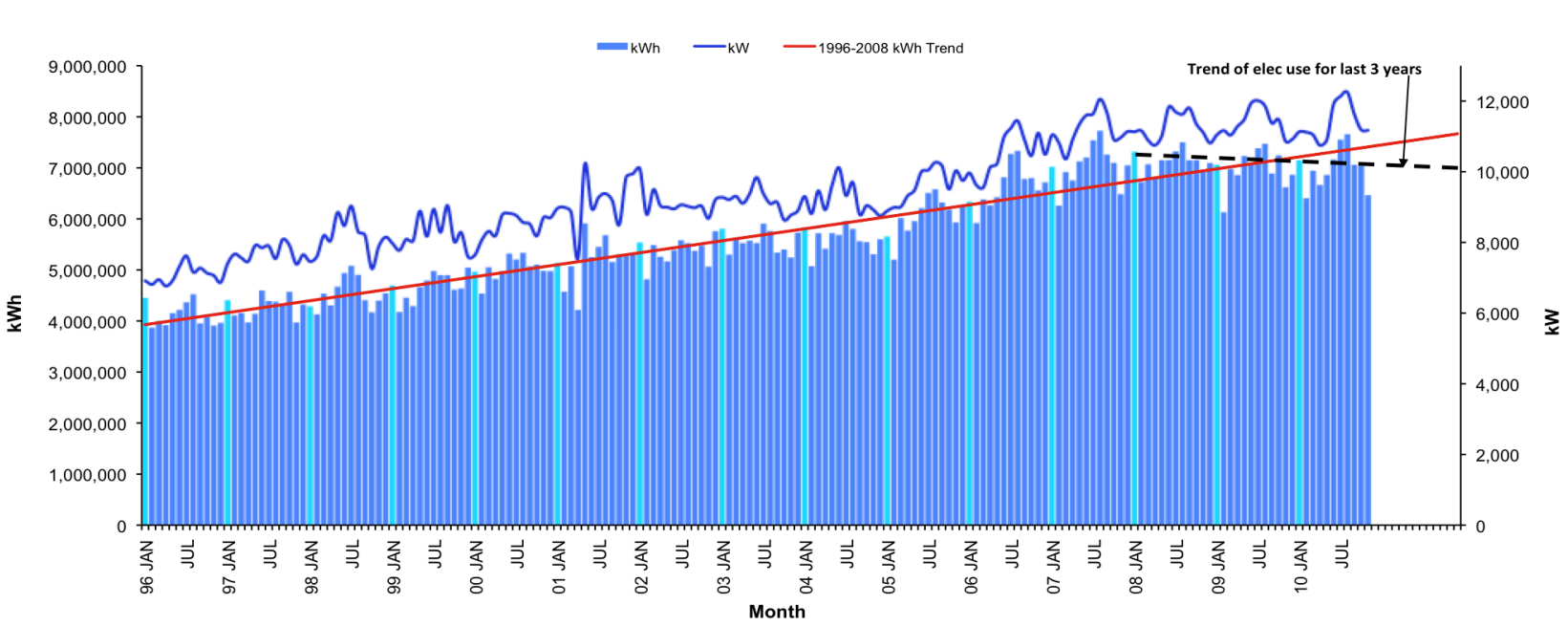
Trends in Electric Rate Increases

Electric Cost



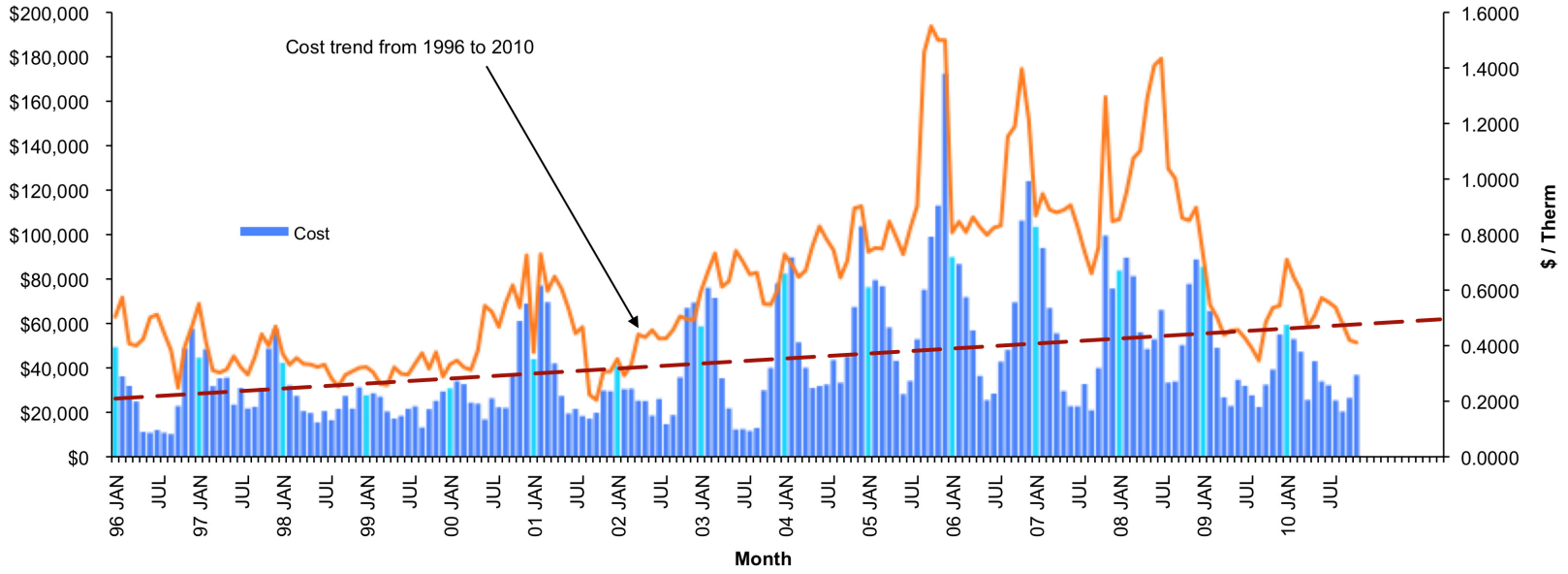
Trends in Electric Use

Electric Use



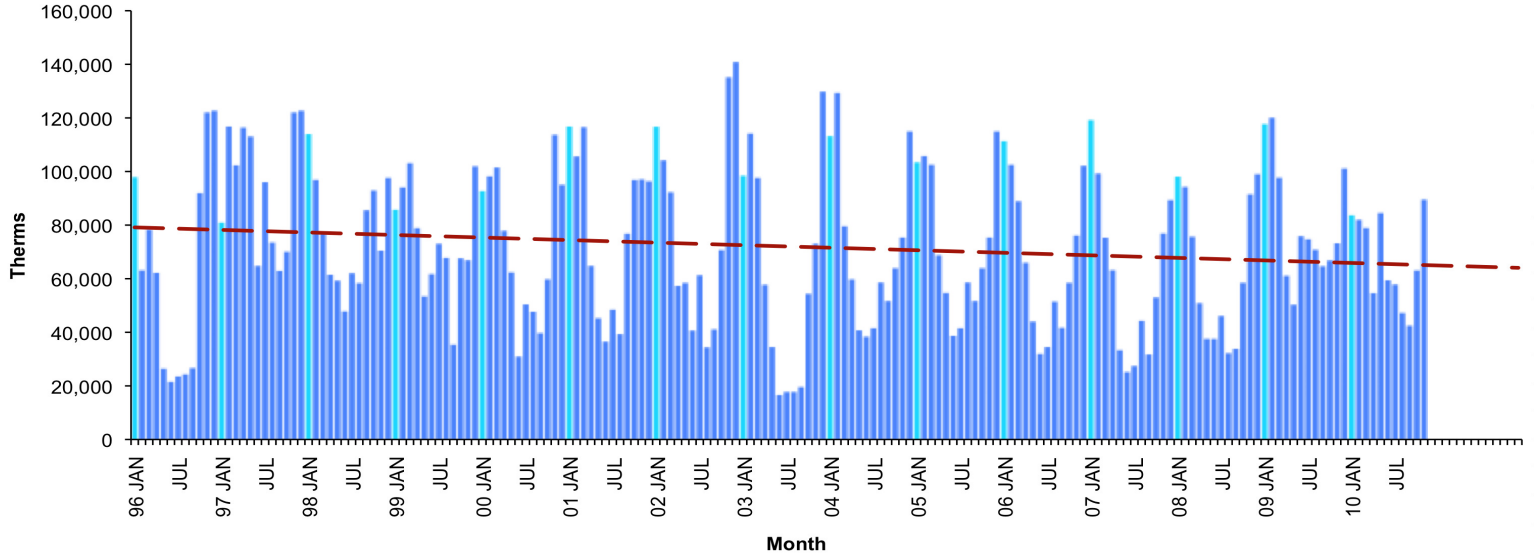
Trends in Natural Gas Rate Increases

Natural Gas Cost

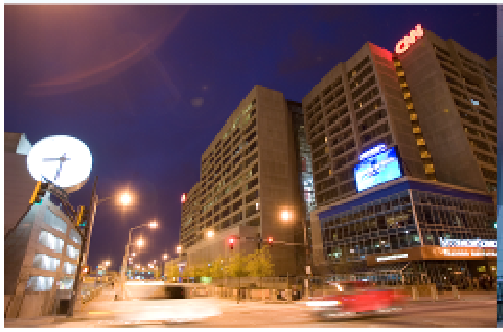


Trends in Natural Gas Use

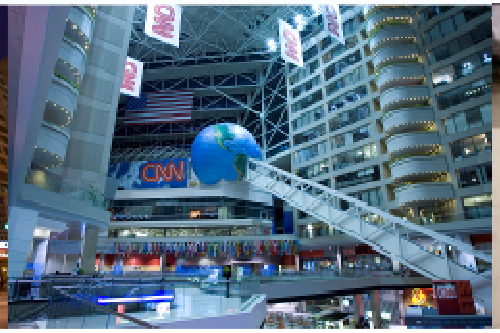
Natural Gas Use



CNNC Energy
Conservation Measures

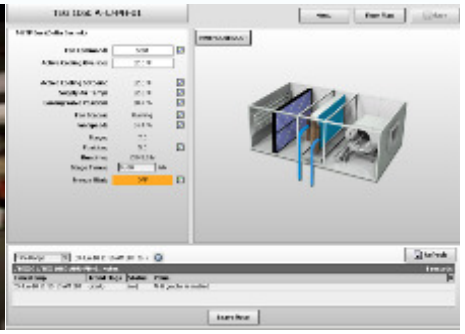


Envelope Upgrades to Glass and Roofs



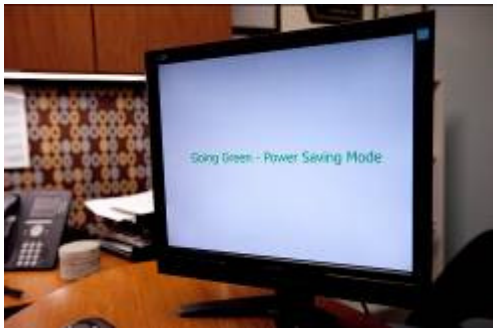
Lighting System Upgrades

HVAC Upgrades



Control System Upgrades

CNNC Energy
Conservation Measures
Operational Initiatives



Computer Sleep Controls

Rate Negotiations

Distributed Generation

Used DOE2.2 Simulation Program

- The facility is simulated with DOE2.2 through the eQuest program
- This program creates an 8670 hour - three dimensional simulation
- Each simulation addresses 464 interior zones and contains 61,400 lines of input
- We have adjusted the simulation to within 1% of actual energy use

15 Year
Implemented Energy Conservation Measures Savings

ANNUAL ENERGY COST SAVINGS in 2010 DOLLARS

No.	Description	Implementa-tion Dates	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	ECM TOTAL
1	New Computer Sleep Controls	March 2008	-	-	-	-	-	-	-	-	$44,485	$50,138	$58,331	152,954
2	Night Setback Control & DDC EMS upgrade of Tstats	January 2000	$36,462	$37,706	**$34,946**	**$34,955**	**$39,015**	**$48,009**	**$48,647**	**$50,249**	**$61,770**	**$50,487**	**$58,510**	500,757
3	Water and HW Savings-Rebuilt CTs & Upgrades & Toilet Fixture Upgrades *	Cooling Towers=2000, other=2006	$23,294	$23,407	$23,182	$76,986	$77,956	$80,095	$80,360	$80,911	**$83,998**	**$81,529**	**$83,734**	715,452
4	Added DDC Controls to Atrium Exhaust Fans	1996	**$4,175**	**$4,070**	**$3,870**	**$5,392**	**$6,385**	**$8,639**	**$8,205**	**$7,710**	**$8,770**	**$4,819**	**$5,265**	81,057
5	Refurbished Atrium HVAC Systems	1997	$10,258	$10,424	$10,092	$9,965	$10,395	$11,342	**$11,459**	**$11,704**	**$13,071**	**$11,977**	**$12,954**	154,591
6	Replace 34 W with T8 Lamps and elect. ballasts	2003	-	-	-	$70,682	$78,100	$94,415	$96,856	**$101,698**	**$126,544**	**$108,504**	**$126,436**	803,235
7	Occupancy Sensor Controls for Lighting Offices	1999	$29,620	$30,806	$28,482	$27,410	$30,334	**$36,773**	**$37,651**	**$39,433**	**$48,976**	**$41,696**	**$48,548**	430,718
8	Gas Engine Peak Shaving Chiller & Heat Recovery Unit	1997	$131,826	$139,809	$128,194	$106,803	$114,048	**$129,322**	**$138,777**	**$154,119**	**$199,431**	**$196,091**	**$231,746**	2,102,178
9	Insulation in Atrium Floor	1997	$8,696	$8,381	$8,010	$11,770	$14,043	$19,213	**$18,111**	**$16,818**	**$18,924**	**$9,663**	**$10,410**	163,331
10	New Central Plant EMS & HVAC EMS	(15%), see ahus - 15%	$8,872	$8,622	$8,210	$23,204	$27,531	$37,365	$53,120	**$49,756**	**$75,238**	**$40,555**	**$44,154**	389,607

CNN Center

15 Year Energy Savings Summary

$7,192,599
Capital Costs thru 2010

$11,186,363
Total savings 1995–2010

$1,723,900
2010 Energy Cost Savings

21,468,000 kWh
and 434,000 Therms
2010 Energy Savings

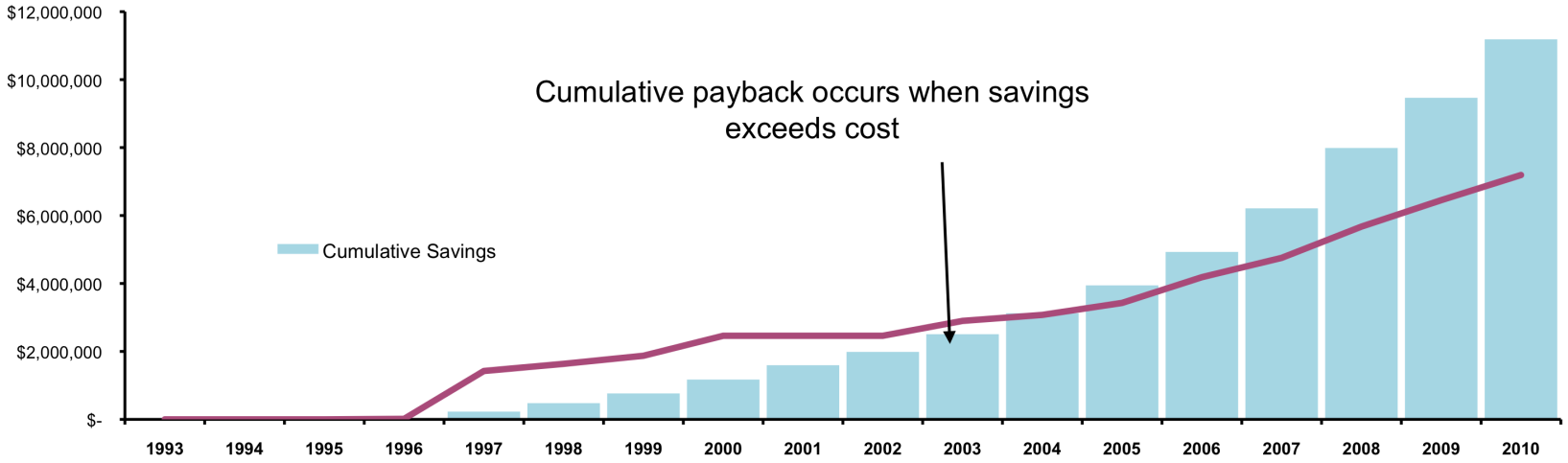
> $1,900,000
Annual Maintenance Savings

16% Better than the 1999 Energy Code

30% Increase in energy costs if no ECMs implemented

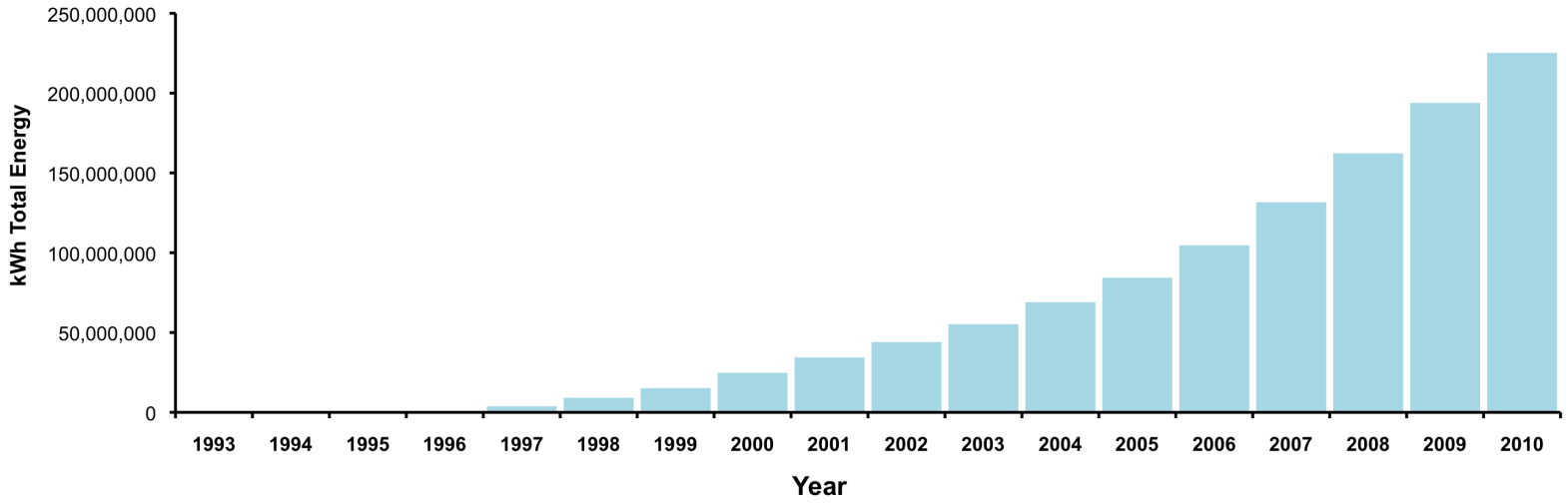
15 Year Cumulative Energy Cost Savings at CNN Center vs Cumulative Costs

Cumulative Savings vs Costs



15 Year
Cumulative Energy Savings at CNN Center

Cumulative Total Energy Savings in kWh for Gas and Electricity



Equal to powering

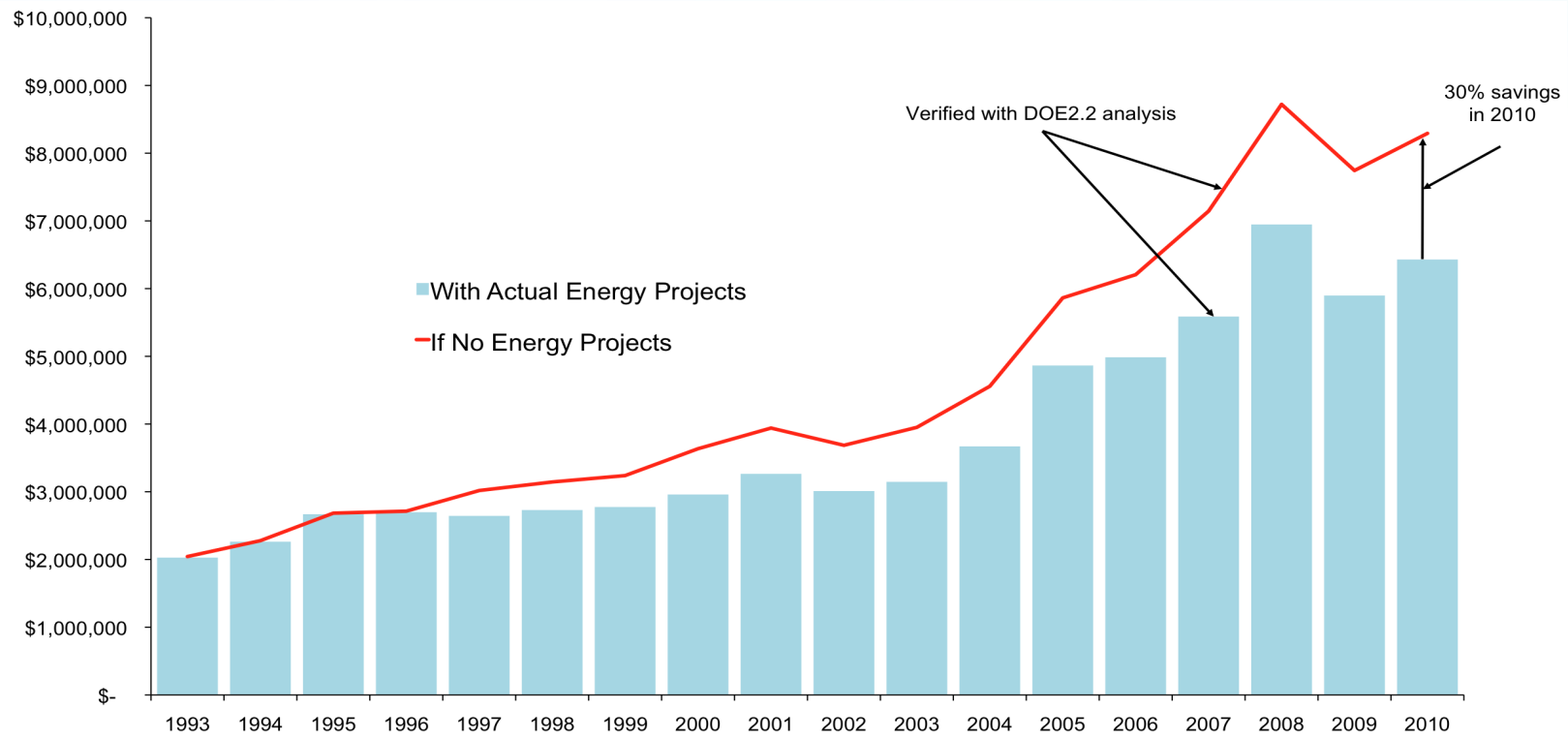
17,000

homes' for one year

CNN Energy Costs

Cost With ECM's vs Cost Without ECM's

18 Yr Projection of Annual Energy Savings - Current vs No ECMs
(each year savings is in that year's dollars)

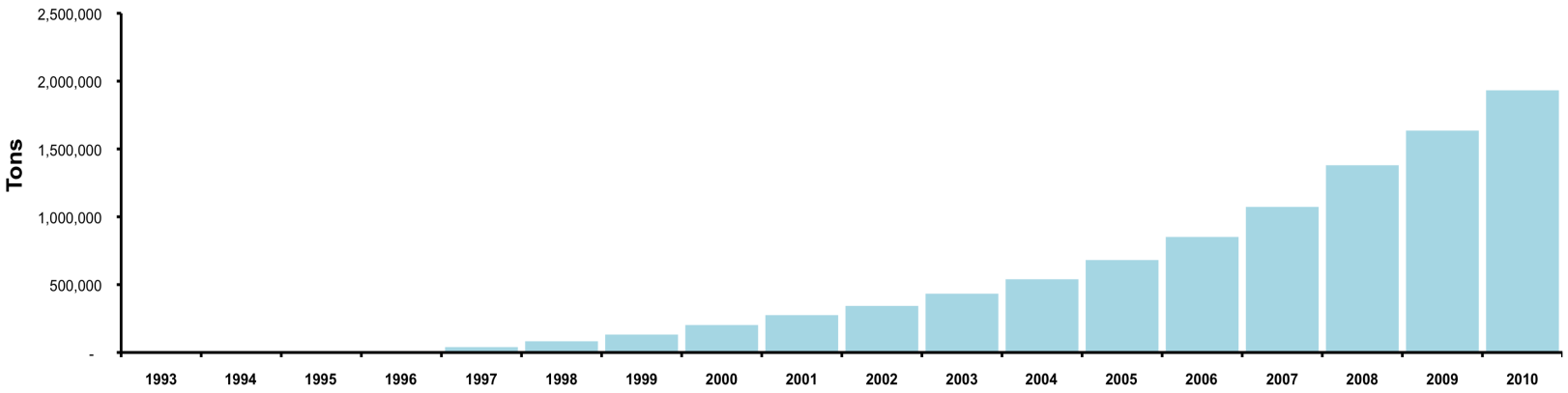


15 Years Reduction in CO2

Due to Energy Savings

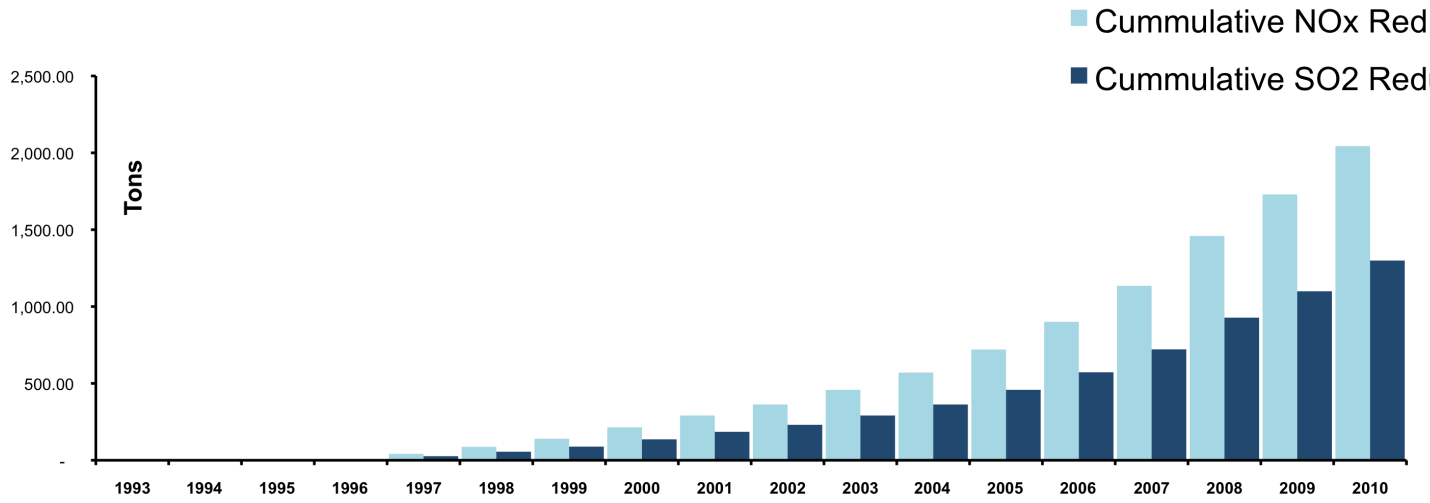
Cummulative CO2 Reduction

Taken from US EPA eGRID data for 2005, and EPA Clear Skys data Baseline for 2008 for non-baseload emission rates.



15 Years Reduction in NOX and SO2
Due to Energy Savings

Cumulative NOX & SO2 Reduction



Taken from US EPA eGRID data for 2005, and EPA Clear Skys data Baseline for 2007 for non-baseload emission rates.

Electric NOx reduction based on GPC average of 0.002 lb per kWh.
Electric SO2 reduction based on GPC average of 0.012 lb per kWh.

Natural Gas NOx reduction based on SE average of 0.12 lb per Therm.
Natural Gas SO2 reduction based on SE average of 0.0006 lb per Therm.

Equal to removing

280,000

cars from the road

CNN
Past Highlights

- Track ECM's Cost vs. Savings
- Utilize Computer Modeling to compare "what if's"
- Store Utility Invoices
- Create Charts that Simplify Results
- Use Known Comparisons for easier understanding

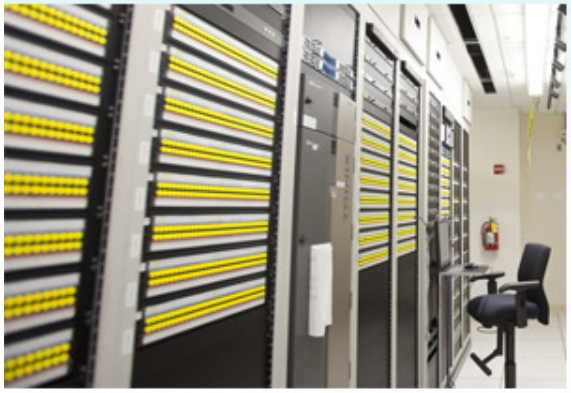
WHAT NEXT

For Energy Savings?

We go to the...

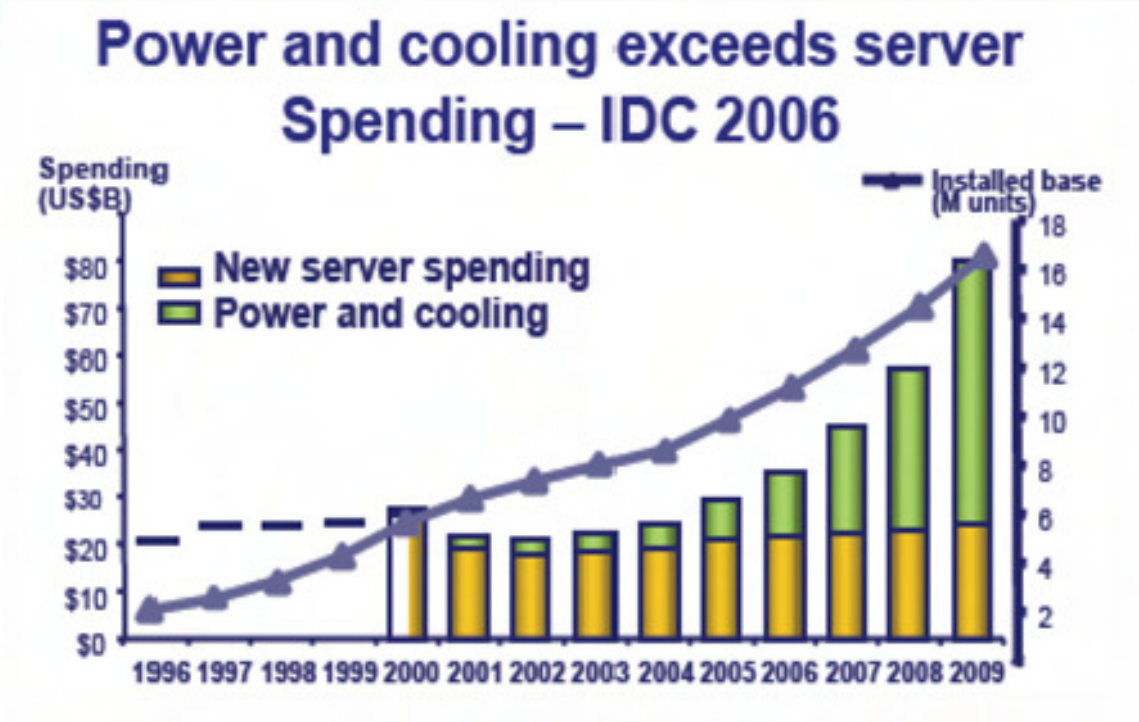
Future Savings Frontier

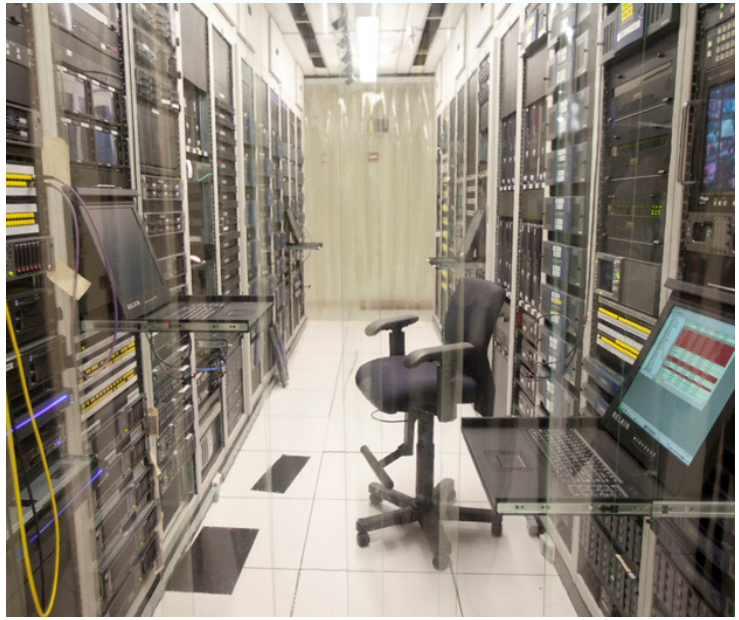
Data Center and Terminal Gear Rooms



- CNNC has 10 Data Centers (DC's) and Terminal Gear Rooms (TGR's)
- DC's and TGR's use 36% of building electricity
- No energy saving initiatives involving data centers have been initiated to date

Power & Cooling
are greatest spend in data centers

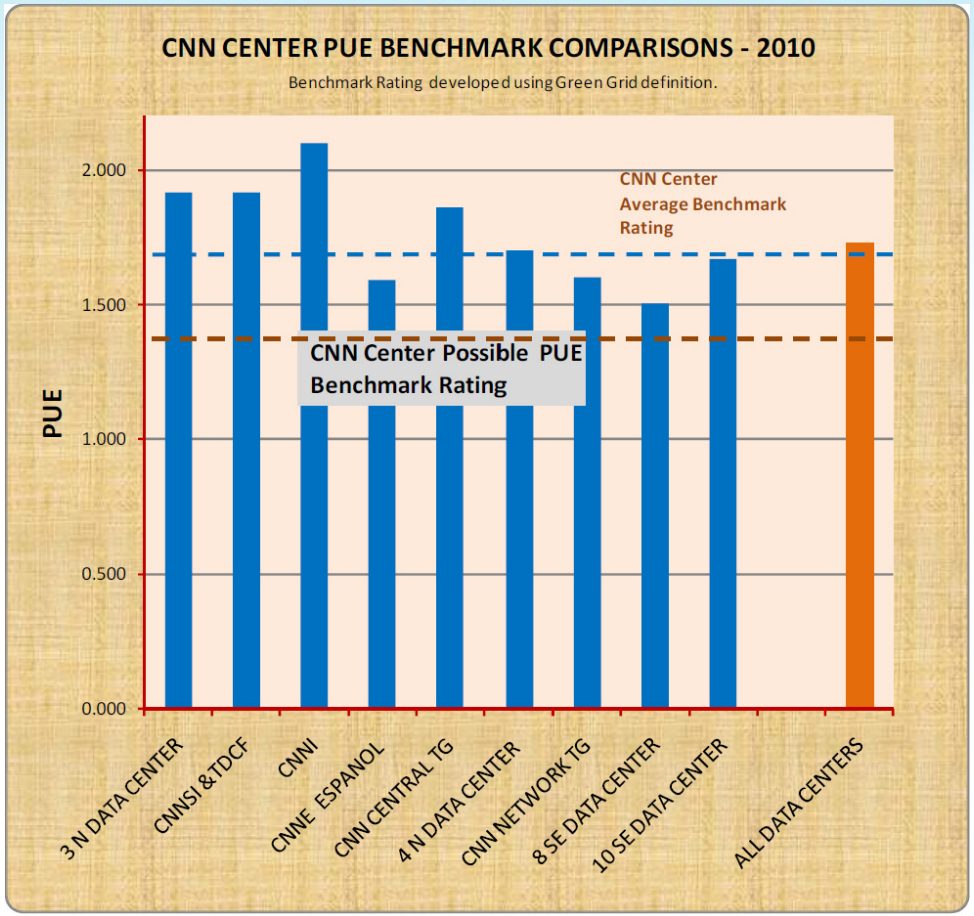




Data Center Energy Savings Phase I: MEASURE!

- The accepted metric of data center Power Utilization Efficiency (PUE)
- The PUE is the IT Load power divided into the Total Data Center Load
- CNNC data centers do not compare well to industry averages for medium and large sized data centers..

CNNC DC & TGR PUE's



Potential savings is over $300K / year

POOR PERFORMANCE
Drivers

- Uncontrolled air flow
  - Open Rack fronts
  - Mixed warm / cold aisle streams
- Over cooling
  - Making as cold as possible “just to be safe”
  - Lack of adequate cooling control
- Lack of Comprehensive Controls
  - Critical area should have more monitoring
  - Better monitoring improves control and ability to use warmer temperatures

Action Items

- Improve airflow efficiency
  - Cold Aisle / Hot Aisle Isolation
  - Close of openings in racks
  - Regulate air volume delivered to racks
- Raise temperatures to industry standard
- Expand temperature and air flow monitoring and control capability

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