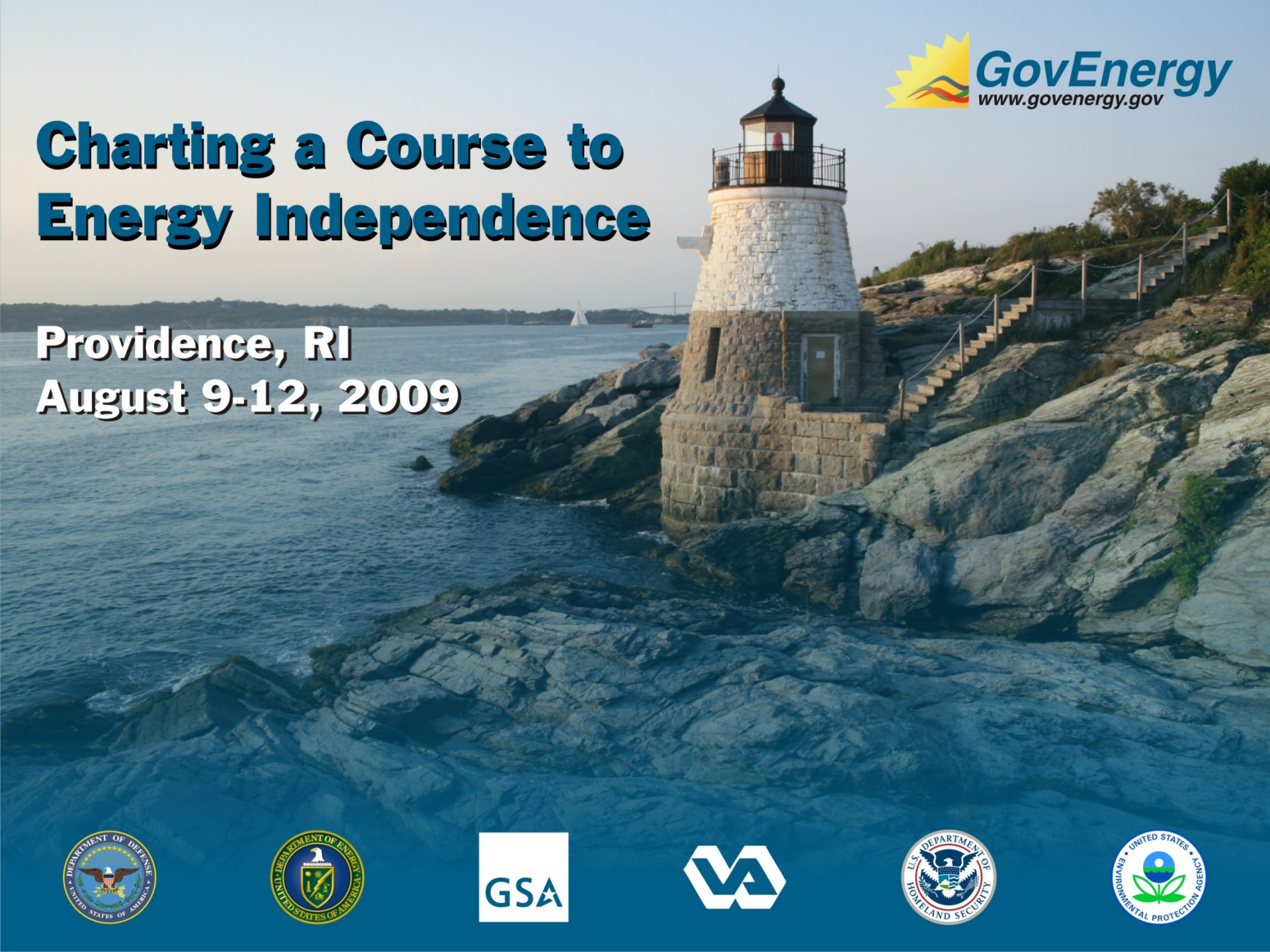

GovEnergy
www.govenergy.gov
Charting a Course to Energy Independence
Providence, RI
August 9-12, 2009
GSA

2008 NCC Energy Efficiency Assessment
One year later.
Where are we?

- USEPA National Computer Center
  Research Triangle Park, NC

GovEnergy
www.govenergy.gov

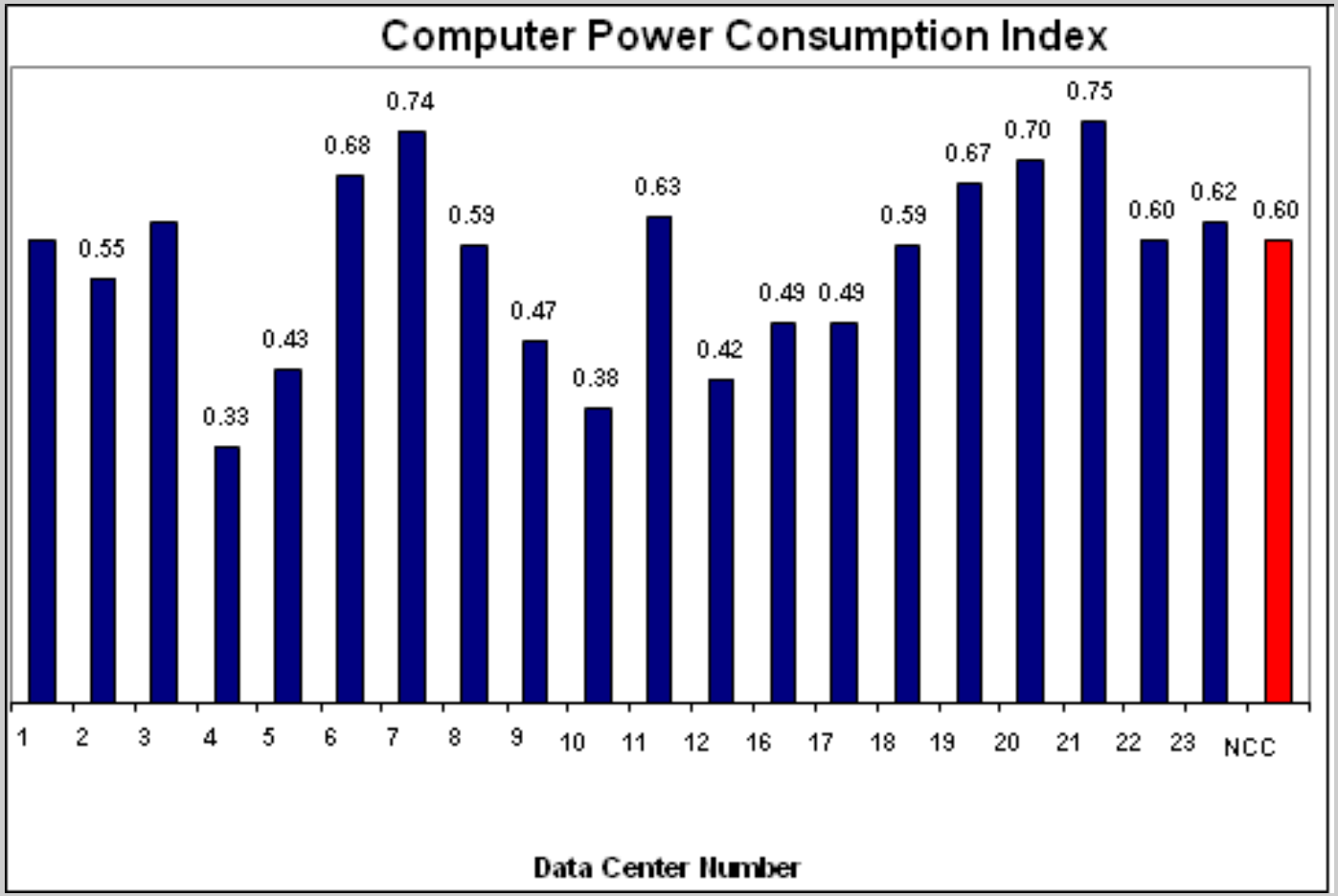
Bill Gaines

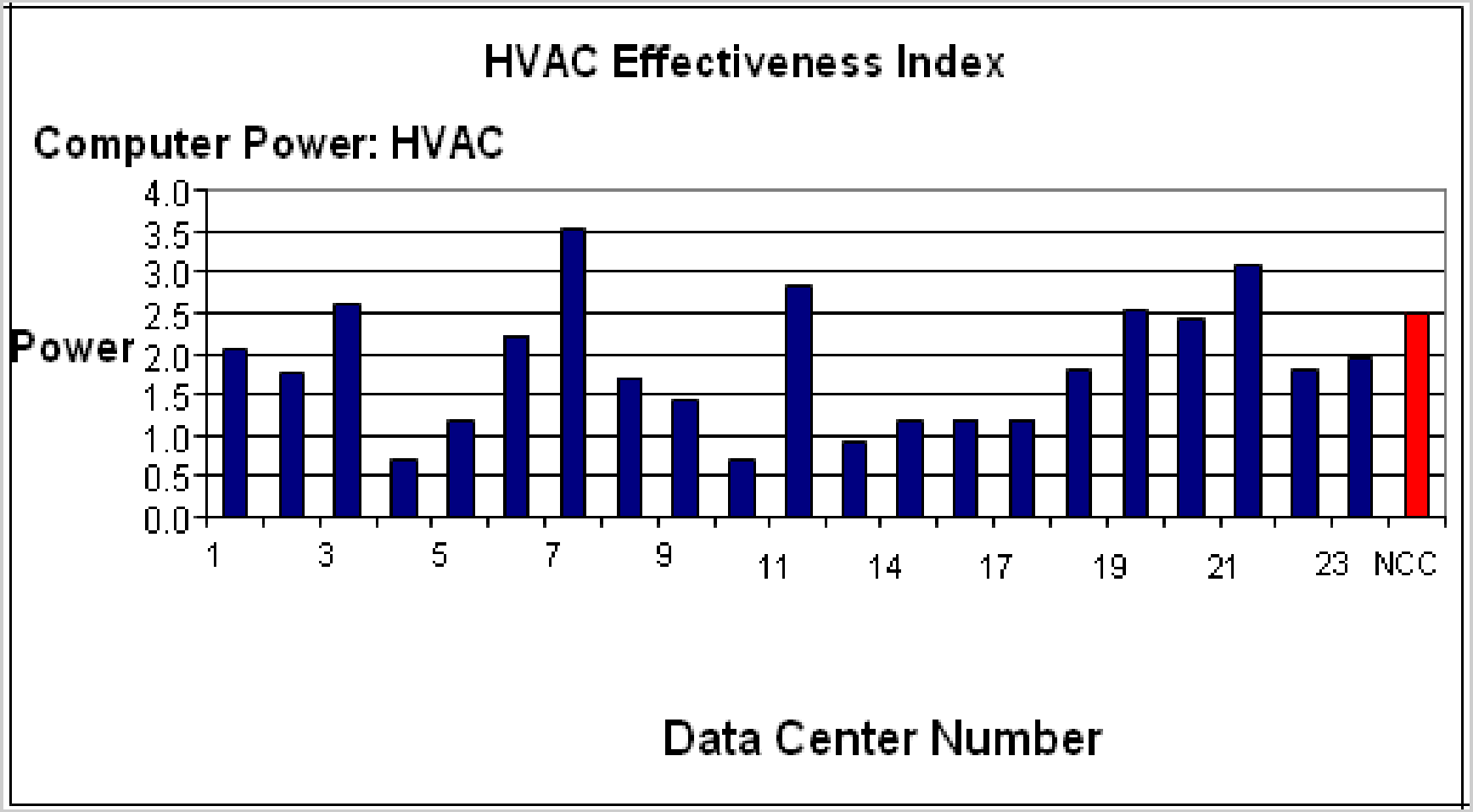
August 9-12, 2009

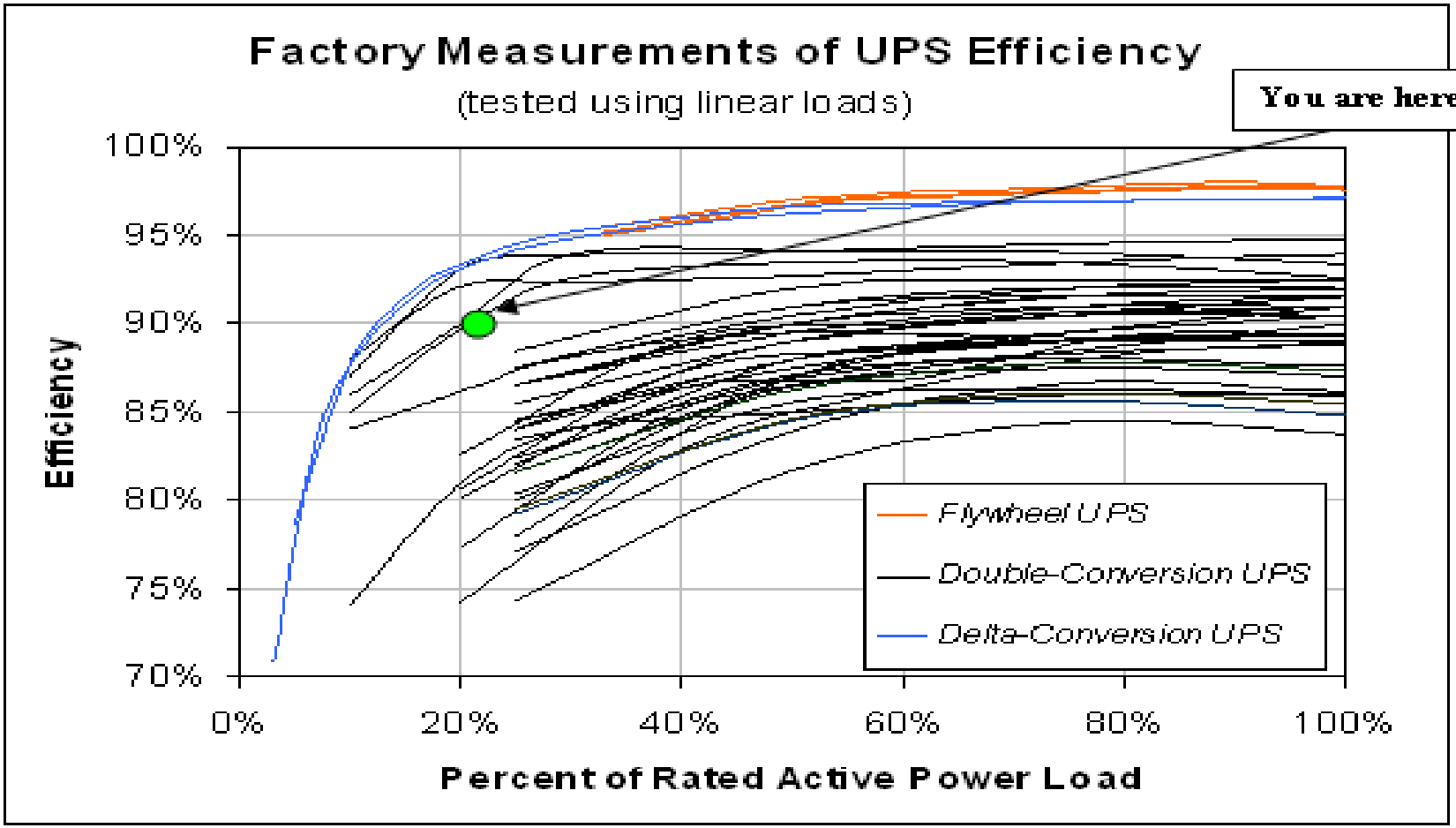
Work of a Talented Photographer

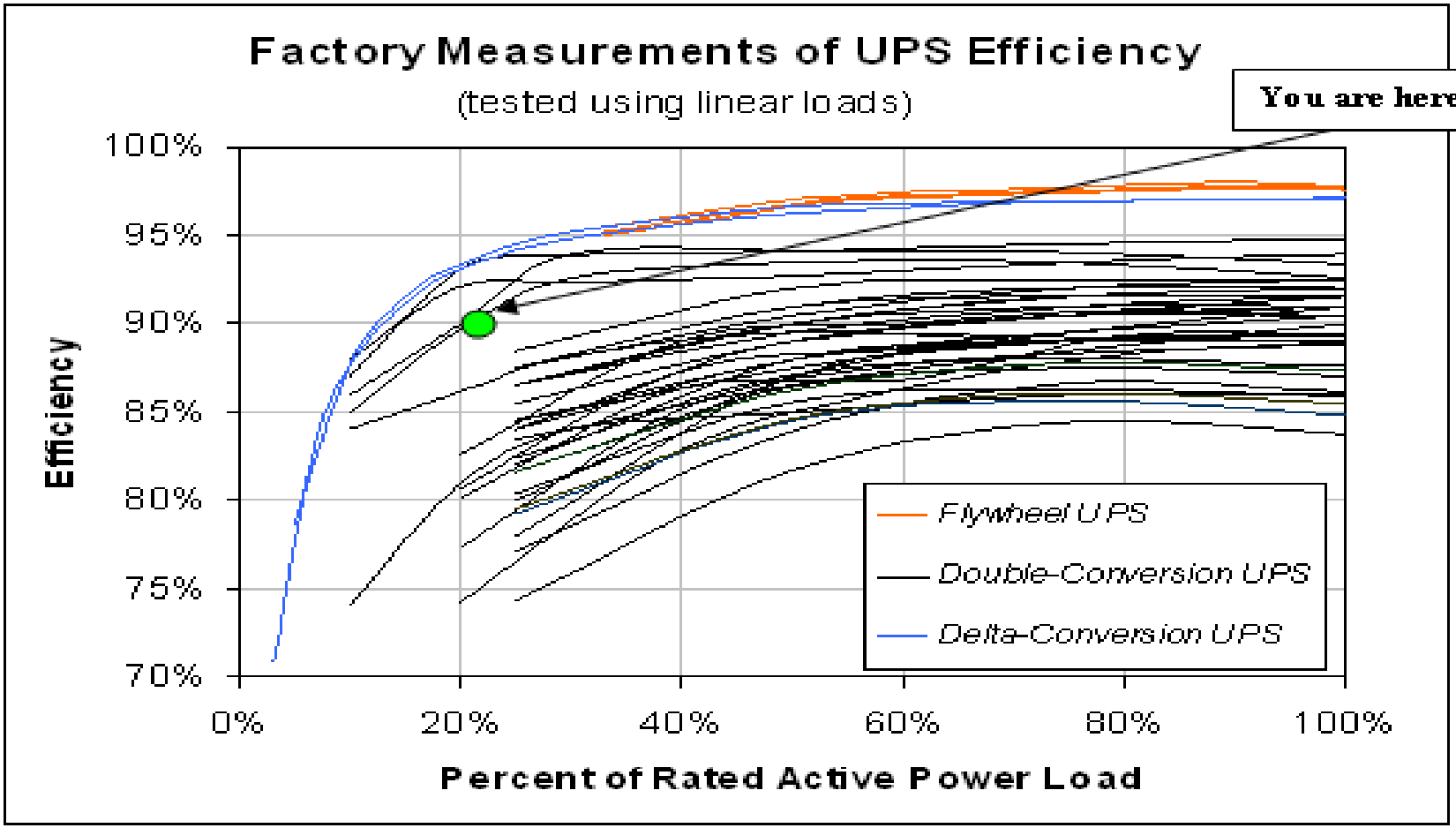
Solar Power

- 1999 Design
- 100,000 sq. ft.
- Two 750 Kw UPS
- Space for additional 750 Kw module
- Infrastructure for future expansion


Computer Power Consumption Index
0.55
0.33
0.43
0.68
0.74
0.59
0.47
0.38
0.63
0.42
0.49
0.49
0.59
0.67
0.70
0.75
0.60
0.62
0.60
1
2
3
4
5
6
7
8
9
10
11
12
16
17
18
19
20
21
22
23
NCC
Data Center Number


HVAC Effectiveness Index
Computer Power: HVAC
Power
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
1
3
5
7
9
11
14
17
19
21
23
NCC
Data Center Number


Factory Measurements of UPS Efficiency
(tested using linear loads)
You are here
100%
95%
90%
85%
80%
75%
70%
Efficiency
0%
20%
40%
60%
80%
100%
Percent of Rated Active Power Load
Flywheel UPS
Double-Conversion UPS
Delta-Conversion UPS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40%
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80%
100%
Percent of Rated Active Power Load
Flywheel UPS
Double-Conversion UPS
Delta-Conversion UPS

Use the Supply air wisely

- Introduce supply air in cold aisles
- Cold supply introduced anywhere else:
- a. Reduces the return air temp
- b. Reduce the CRAC cooling coil efficiency
- c: Does not cool the computer equipment

Use the Supply air wisely

Place perforated raised floor air tiles in cold aisles only.

- Keep all other solid raised floor tiles in place.
- Seal between the raised floor and building structure around the room perimeter and at ramps.
- Seal the raised access floor around racks and panelboard penetrations.
- Seal all cable openings for computer equipment cabinets.

Retrofit with VSD's

- A 10% reduction in supply air flow :
- Results in a 27% reduction in fan kW when combined with retrofit of Variable Speed Drives (VSDs) for the fan in each CRAC.

NOT DONE YET

Retrofit with VSD's

- The VSDs would control to a constant static pressure beneath the raised access floor.

- Estimated cost: $58,500
- Estimated savings: $28,500/ yr
- Simple payback: 2.1 years.

Raise CRAC unit supply air temperature

- ASHRAE TC9.9 recommends maintaining the server inlet temperature between 68ºF and 77ºF.
- Cold aisle temperature should ideally be within these limits
- Raising the current supply air temperature from the CRACs = greater efficiency

Raise CRAC unit supply air temperature

- In 2008 the return air temp was 68 degrees F and supply air was 48 degrees F.

Raise CRAC unit supply air temperature

- In 2008 the return air temp was 68 degrees F and supply air was 48 degrees F.
- Presently, the return air temp is 72-77 degrees F and the supply air is 55 – 69 degrees F.

Raise CRAC unit supply air temperature

- Increasing of 8 degrees can increase the sensible cooling capacity of each CRAC by 29%, reducing the number required to operate to meet the cooling load.

Raise CRAC unit supply air temperature

- Increasing of 8 degrees can increase the sensible cooling capacity of each CRAC by 29%, reducing the number required to operate to meet the cooling load.
- ***Estimated cost: $0.00***
- ***Estimated savings: $10,000.00; estimated simple payback is not meaningful***

Reduce RH humidity control to one control point.

- Disable RH control in all CRACs:
- Reprogram CRAC controller
- Turn off the domestic supply to each CRAC
- Disable each CRAC humidifier.

Reduce RH humidity control to one control point.

- Existing AHU-7 should be commissioned to supply minimum outside air into the space at 68-77 degrees F. and 40-55% relative humidity.

  Eliminates energy wasted by the CRACs fighting each other.

  Estimated cost: $5,000

  Estimated savings: $30,000/ yr

  Estimated payback: 0.2 years

Eliminate humidifiers in electrical and UPS room

- No equipment in either room requires relative humidity control for proper performance.
- Each humidifier has a capacity of 7.2kW, so disabling them both should reduce winter peak demand by 14.4kW.
- Estimated cost: $0.00
- Estimated savings: $500/yr

Lighting Control

- Control non-emergency lighting with occupancy sensors or interval timers.
  - NOT DONE YET

Lighting Control

- Control non-emergency lighting with occupancy sensors or interval timers.
- Operate the Data centers with only exit and egress lighting operating at all times
- Occupancy sensors or interval timers can switch non-emergency lighting on in a portion of the data center when occupied.

Lighting Control

- Control non-emergency lighting with occupancy sensors or interval timers.
- Operate the Data centers with only exit and egress lighting operating at all times
- Occupancy sensors or interval timers can switch non-emergency lighting on in a portion of the data center when occupied.
- ***Estimated savings: 75% of lighting energy expended prior to installing occupancy sensors or timers.***

Minimize PDUs

- As technology refreshes occur, minimize the number of PDUs in the data center.

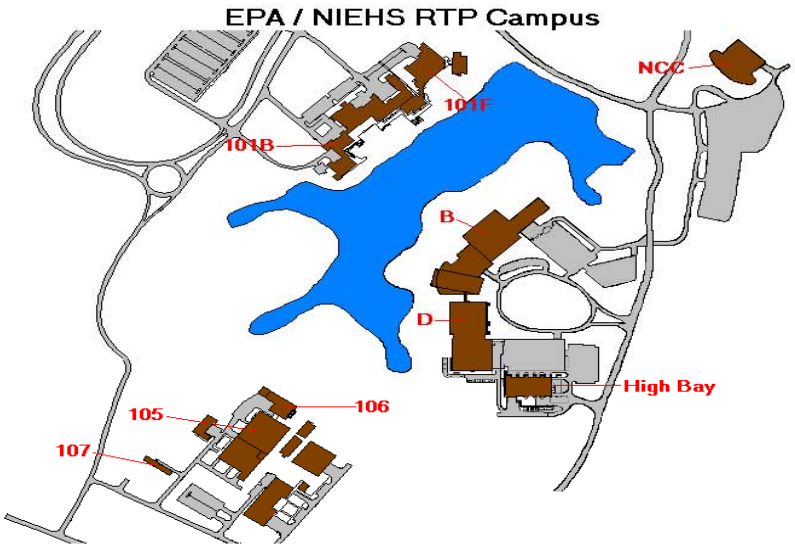
Consolidate Datacenter

- There is a significant amount of available white floor space.
- Additional computing needs of the EPA could be relocated to this facility as the need arises.
- Increased NCC load =increased efficiency
- Better utilization of the high priced real estate within the datacenter.

Campus layout – Metering system

ION EEM | Start | Dashboards | Reporting | Trend Analysis | PQ Analysis | Billing | Administration | Logout

Help



(Old Saved cost allocation reports)

Utility Totals

Electric (kW)	14,160	(Summary Screen) (kW swd Last 30 Days)
Natural Gas (Ccf/hr)	311	(Summary Screen) (Ccf Last 30 Days)
Water (Ccf/hr)	25.939	(Summary Screen) (Ccf Last 30 Days)

Campus Energy Totals

Energy (kBTU/hr)	46,094	(Summary Screen) (Last 30 Days)

Weather Data

Temperature	81.0	(Summary Screen) (Last 30 Days)

Technology by Schneider Electric ©2007

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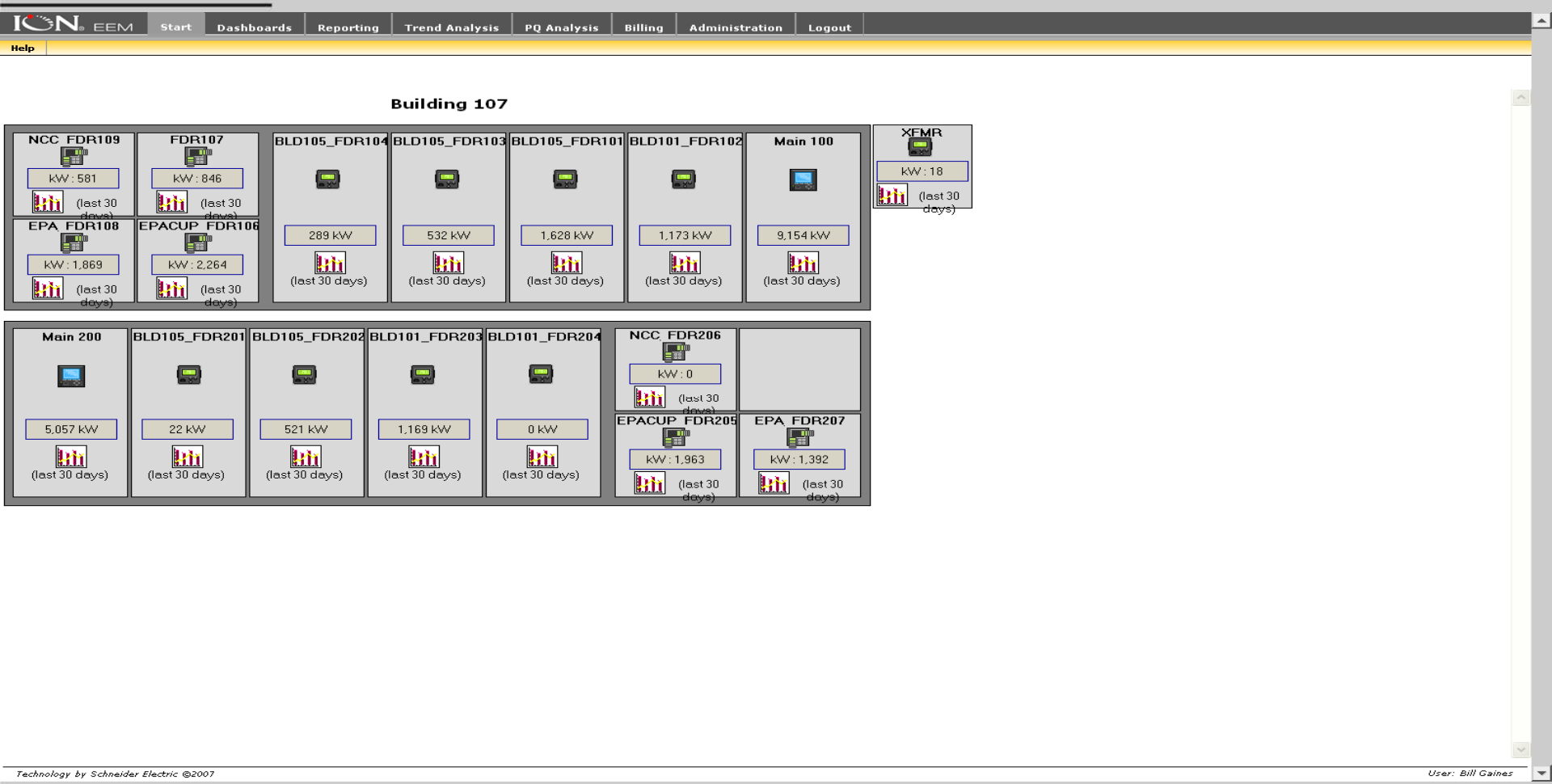
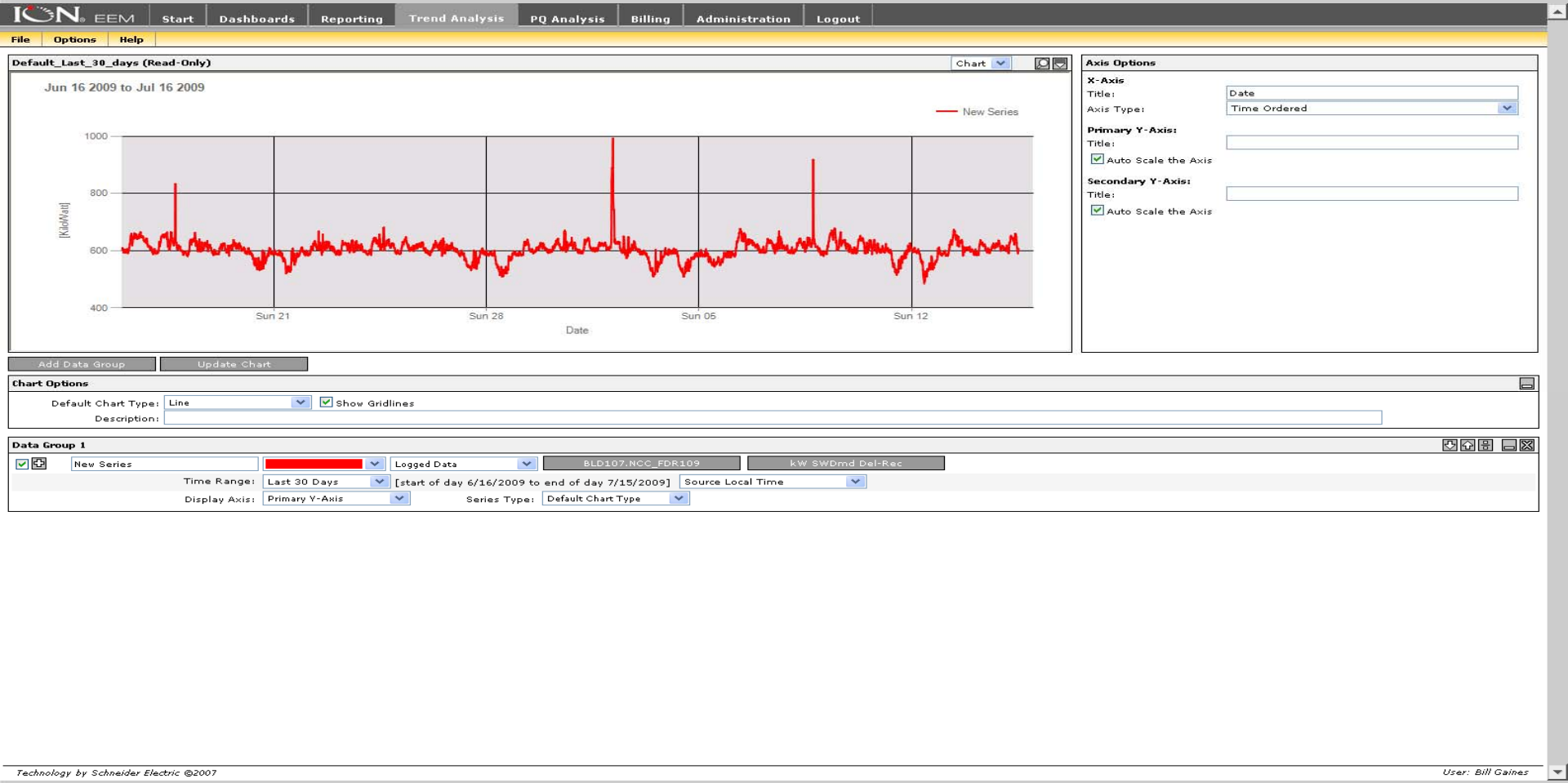
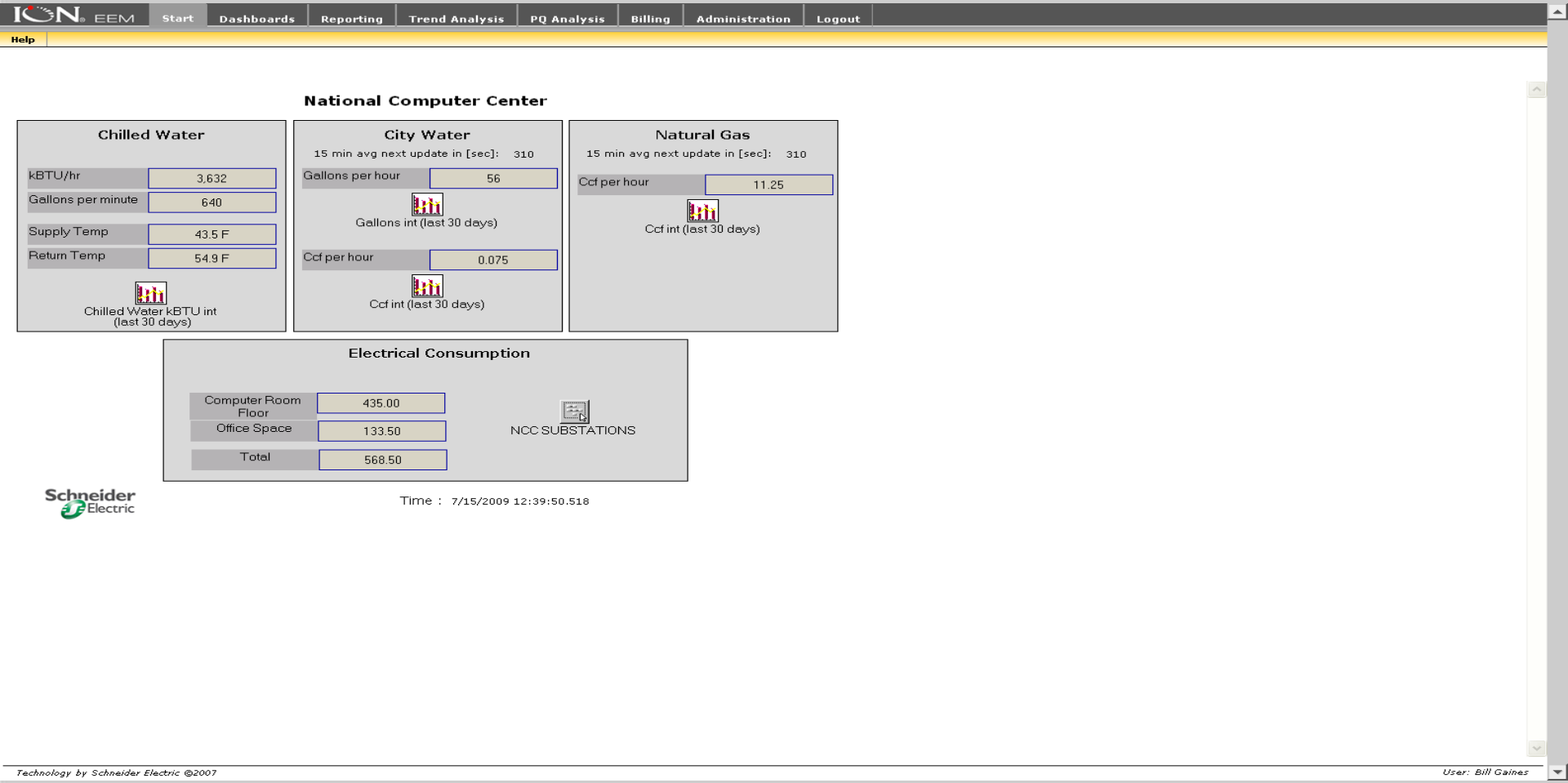
Campus Electric meters



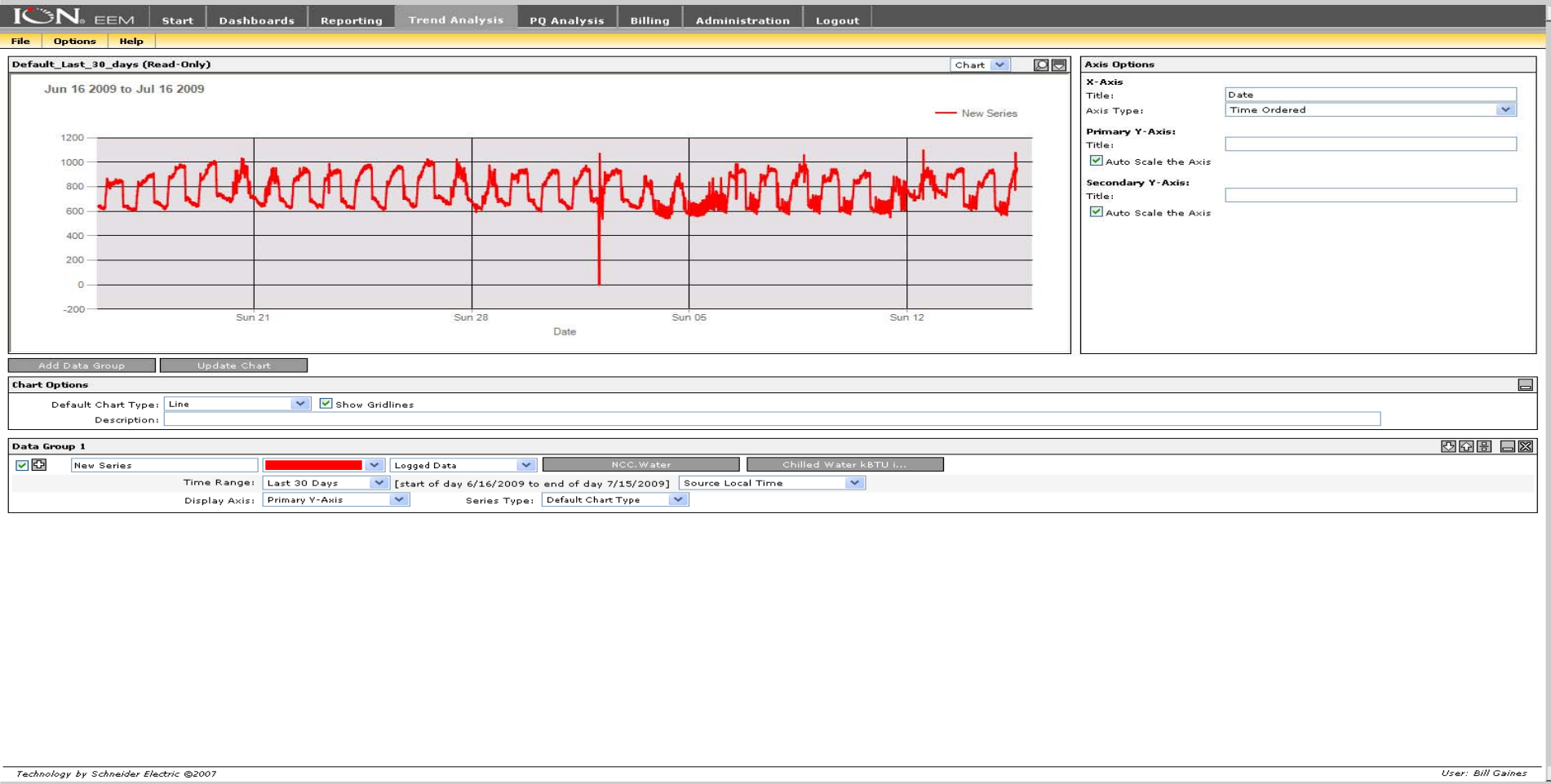
Electric feed to NCC



NCC Metering – main screen



NCC chilled water



GovEnergy
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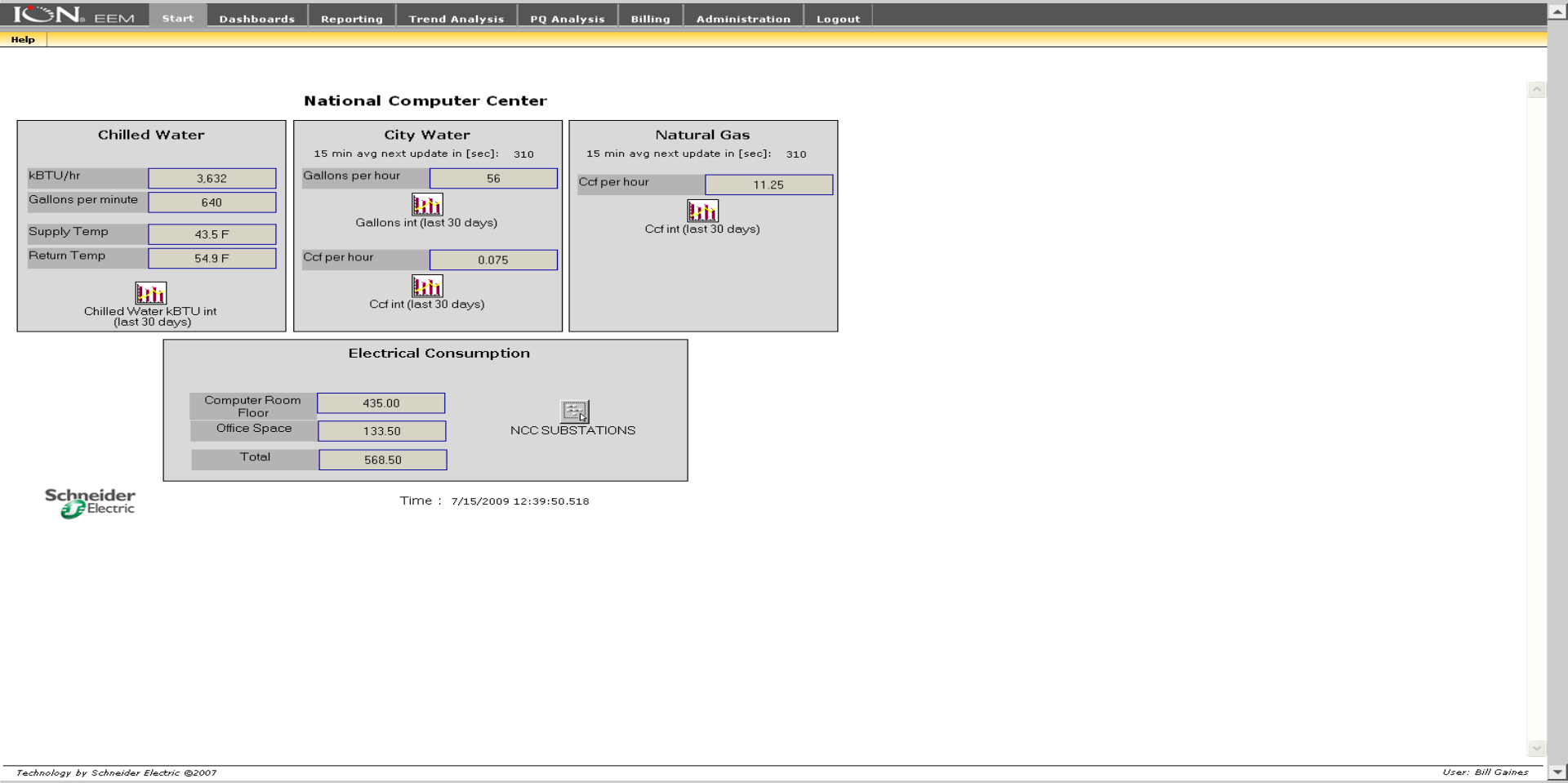
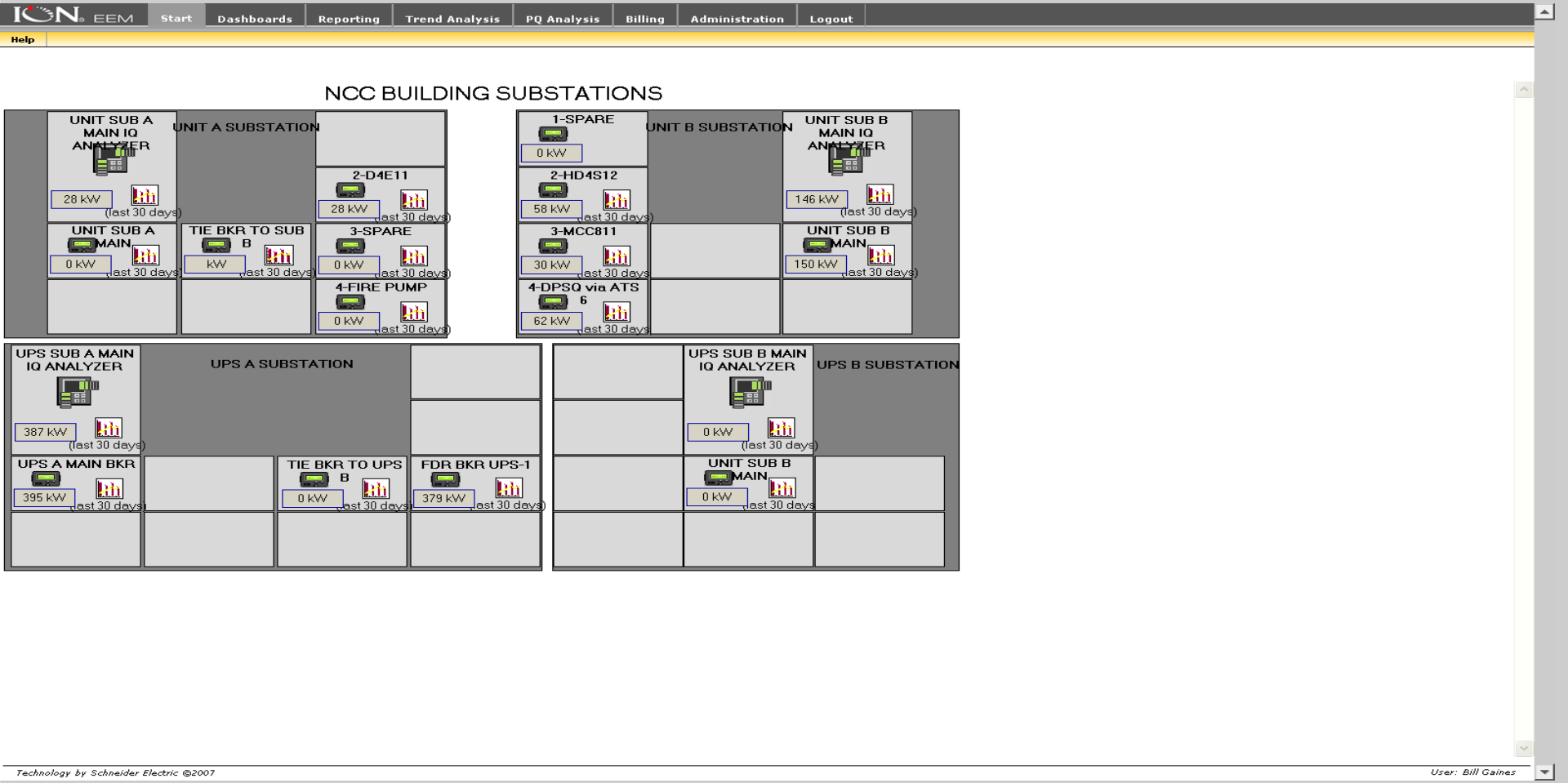
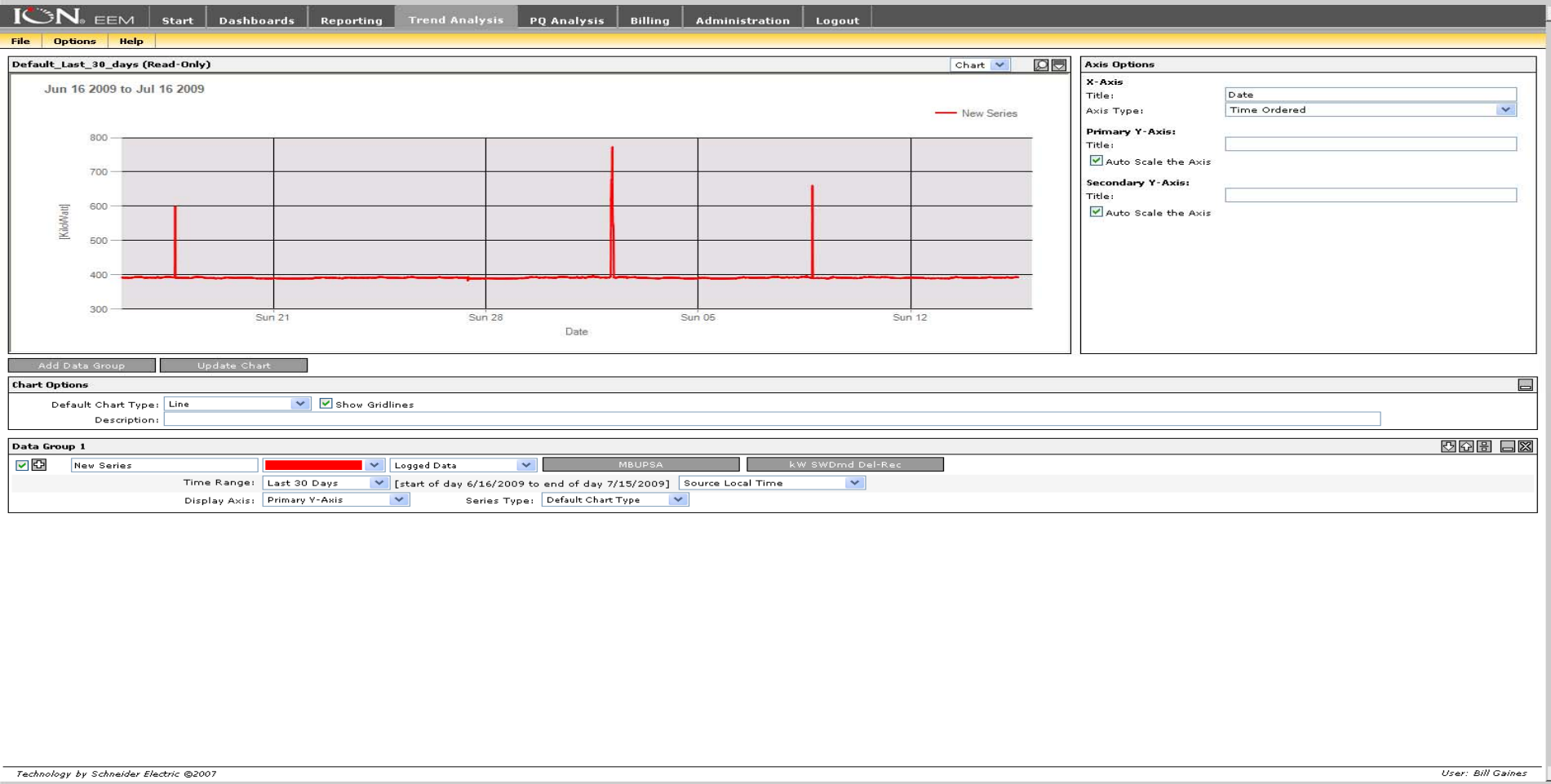
NCC Metering – main screen



NCC sub-metering



Computer floor electric sub-metering



Would you like to know more about this session?

- Bill Gaines
- USEPA
- Mail Code C604-01
- Gaines.bill@epa.gov
- 919-541-3563
- Don’t forget to fill out and drop off your session evaluations.