The Mainframe "Gas Gauge" Manual

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Notes:

Performance is in Internal Throughput Rate (ITR) ratio based on measurements and projections using standard IBM benchmarks in a controlled environment. The actual throughput that any user will experience will vary depending upon considerations such as the amount of multiprogramming in the user's job stream, the I/O configuration, the storage configuration, and the workload processed. Therefore, no assurance can be given that an individual user will achieve throughput improvements equivalent to the performance ratios stated here.

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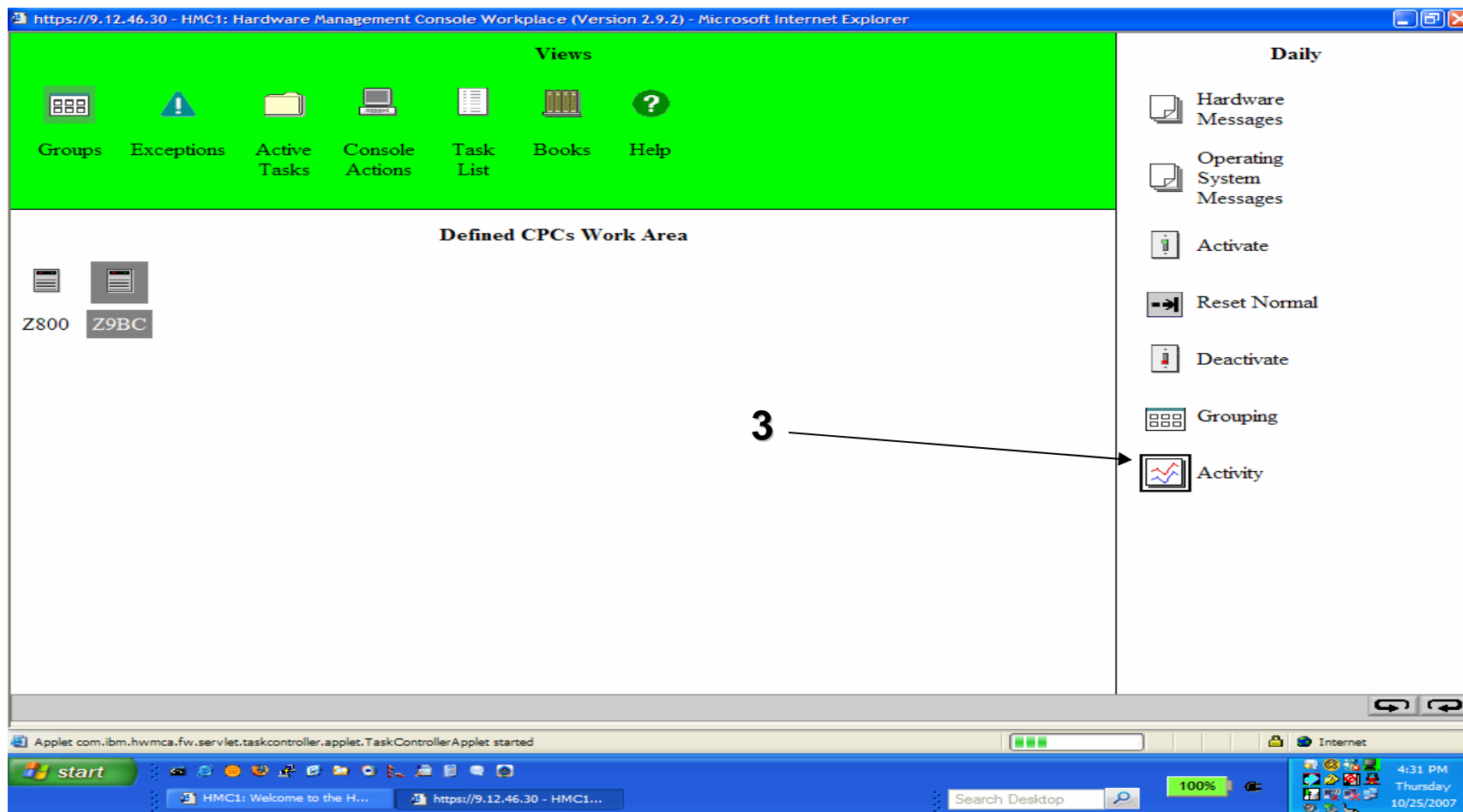
The Mainframe "Gas Gauge" Manual

- **Mainframe power and temperature monitoring information is available using the System Activity Display (SAD) produced by the Hardware Management Console (HMC).**

- **In order to use this, the mainframe must be an IBM® System z9™ and must be running Driver 67 level licensed internal code.**

  - Driver 67 is on all machines shipped after May 11, 2007

  - It can normally be applied non-disruptively to machines shipped prior to May 11, 2007

  - Driver 67 delivered new functions to IBM System z9 Enterprise Class (z9™ EC) (GA3) and IBM System z9 Business Class (z9 BC) (GA2)

  - Contact your IBM Service Rep if you need a driver upgrade

- **Step "0" Log on to the HMC and drive**

The HMC: Pick your System
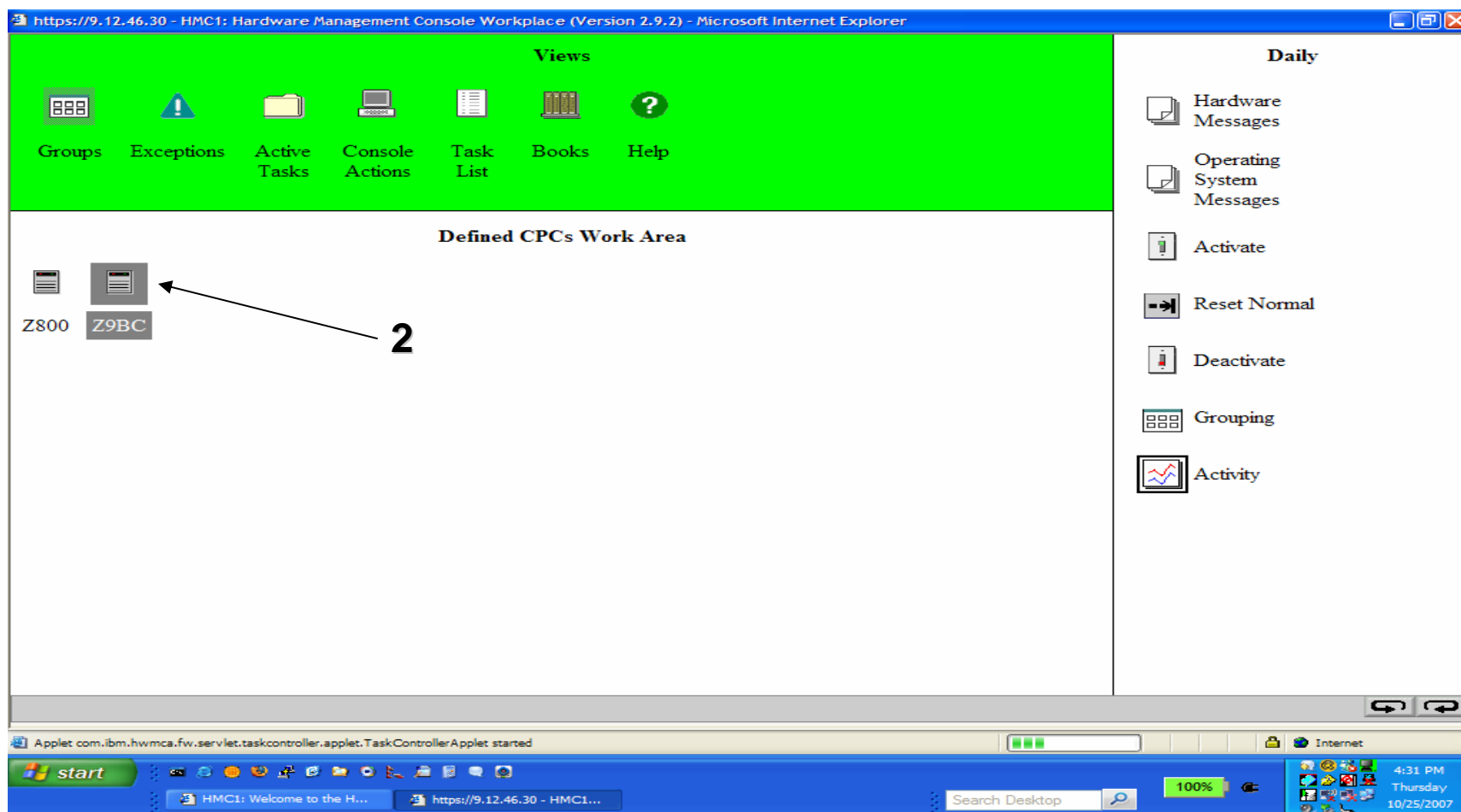
1. **Select "Groups",**
2. "Defined CPC's" will display the "Defined CPCs Work Area", **select the CPC** that you want to monitor, in this case z9 BC, (so that the correct CPC icon is grayed-out), on the right hand side of the screen ensure that the "Daily" tasks pane is showing

The HMC: Select Activity

3. Double-click **selecting the "Activity"** icon in the "Daily" tasks pane.
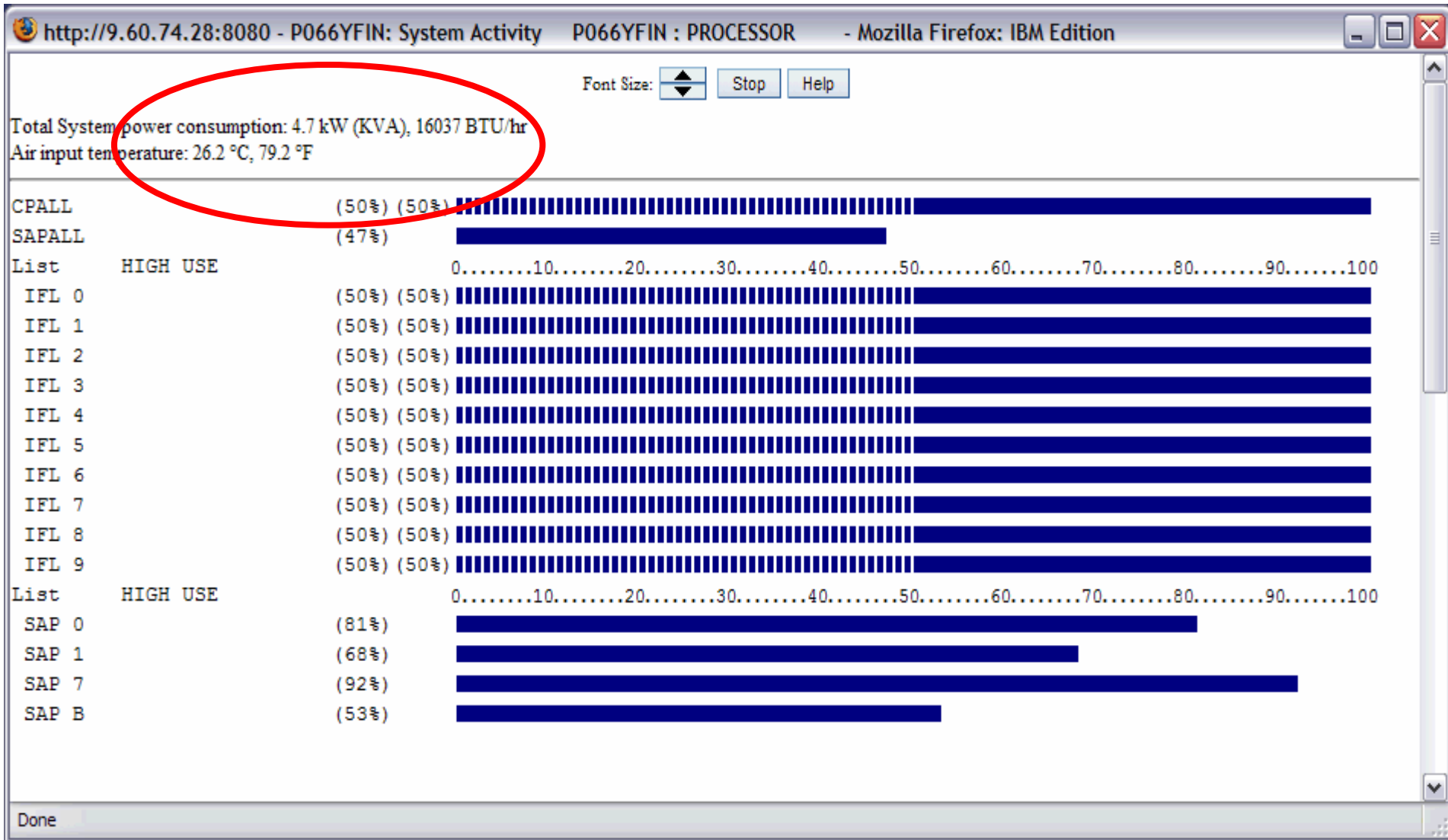
KW, BTU/hr and Inlet temp. The Mainframe "Gas Gauge"
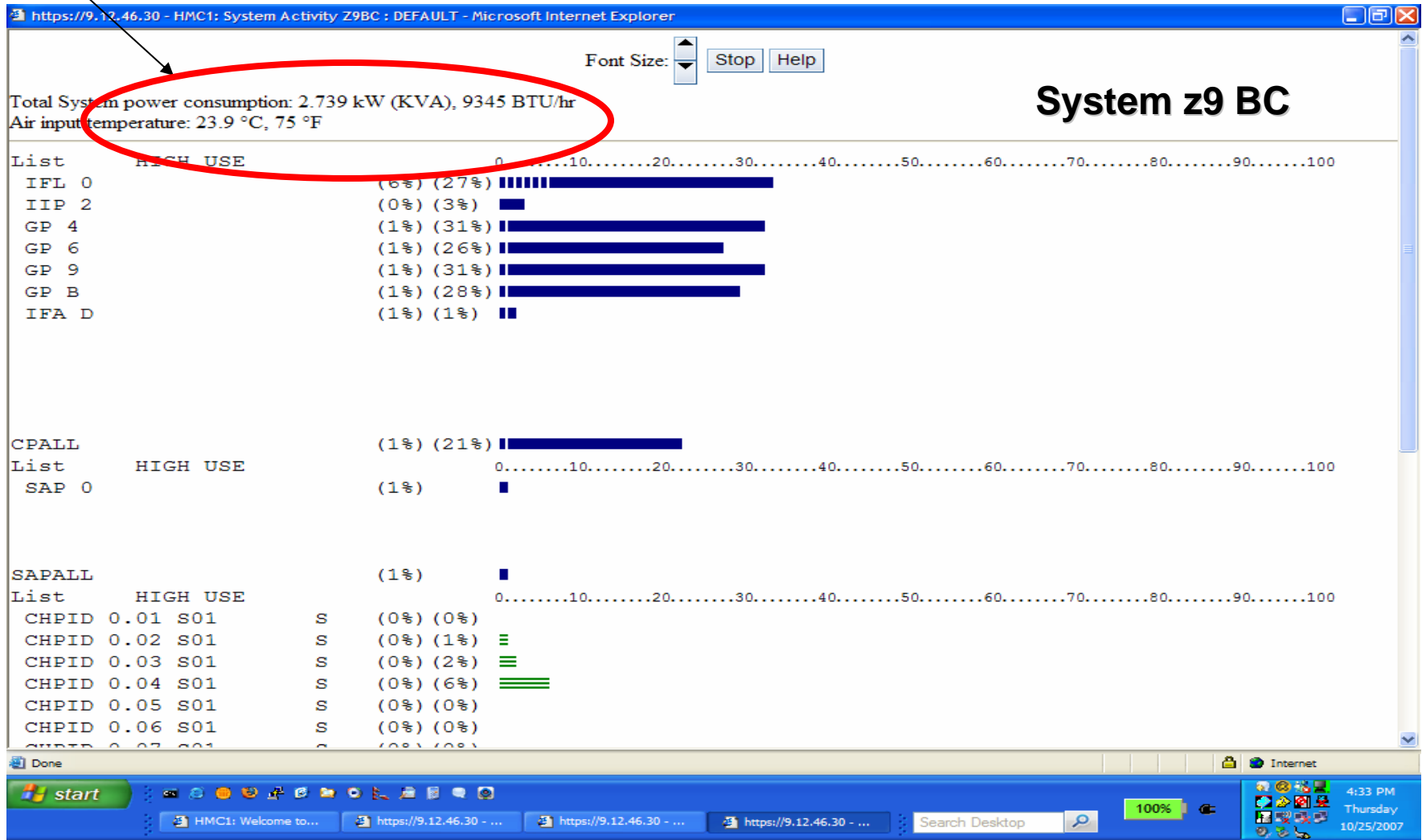
Once the SAD is running, you can see the power and cooling figures at the top of the display. These numbers are recorded every 15 seconds by service element.

Example: System Activity Display
z9 EC, model S18, all IFL machine running 100%

Energy Efficient Mainframe Resources

- **IT Optimization:**

  – http://www-03.**ibm.com**/systems/z/energy_efficiency/

- **Spaces / Collaboration Group**

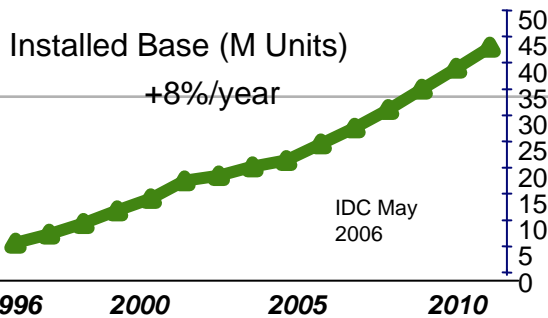- **IBM developerWorks® right side of home page (spaces)**

  – http://www-128.**ibm.com**/developerworks/spaces/greenmainframe

- **Questions or success stories:**

  – David F. Anderson PE

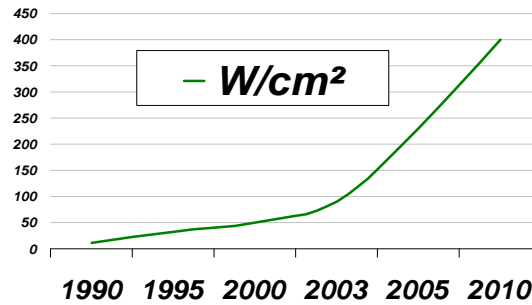   **Green Consultant**

    dfa@us.ibm.com

Increased number of servers	Increased processor consumption	Increased cost of electricity

Installed Base (M Units)
+8%/year

IDC May 2006

50
45
40
35
30
25
20
15
10
5
0

1996 2000 2005 2010

450
400
350
300
250
200
150
100
50

— **W/cm²**

1990 1995 2000 2003 2005 2010

Log of electricity price index

1,5

1

0

1980 1990 1995 2006
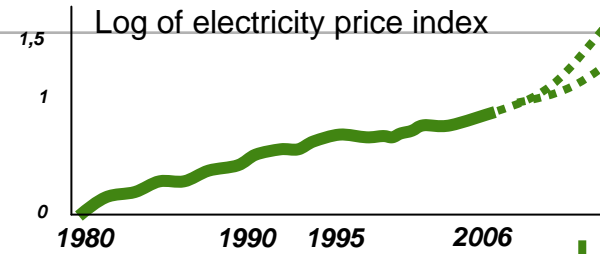
Energy has become significant part of the TCO, how is it consumed?

100 Units

35 Units

33 Units Delivered*

*Data source: *U.S. Department of Energy May 18, 2007*

Data center

Server hardware

Processor

Server loads

HVAC, UPS **55%**

IT Power **45%**

Other 70%
(Power supply, fans, memory, disk)

Processor 30%

Performance, Capacity/ Watt

Up to 95% idle resource

TYPICAL USAGE RATES		
Mainframe 80 – 100%	**UNIX® 10 – 20%**	**Wintel 5 – 12%**

Resources used at **5-20%** average for appl. load

How to improve efficiency

Reduce cooling/UPS needs vs. energy going in servers, capture heat at source (Potential gain 10%)	**Higher efficiency infrastructure, power management'** (≥ 3yrs older is good target)	**Reduce consumption @ chip level** (Cap power usage)	**Reduce idle/unused capacity which still consumes energy** (Utilization 5 to 20 % gain)
More efficient cooling and energy supply	*Better server hardware design*	*Advanced processor design + process*	*Enhance resource usage rate with consolidation and virtualization*