



# Ethernet Power Consumption for Cisco<sup>®</sup> Switches



# Introduction

- Why is network power consumption important?
- How can we measure it?
- How much power do Ethernet switches consume?



# Network Power Consumption

- Customers calculating total cost of ownership need to factor in power consumption.
- Likewise, power consumption contributes to a company's carbon footprint.
- Miercom was commissioned by Cisco to measure power consumption in Ethernet switches



## Power Consumption Examples

- 33 watts is the power consumed by a ceiling fan at average speed.
- 60 watts is the power required to light an incandescent bulb.
- 80 watts is the power consumed by an average PC.
- 200 watts is the power consumed by an average LCD.

# Miercom Measures Power Consumption

## Device Under Test



**Traffic Generator**

Cisco® Catalyst 2960 48TC-L
Cisco Catalyst 2960G-48-TC-L
Cisco Catalyst-3750G-48PS
Nortel BayStack 5510-48T
HP ProCurve 2650
Cisco Catalyst 3560E-48PD
Cisco Catalyst-3750E-48PD-F
3Com 5500G-E
HP ProCurve 3500yl-48G

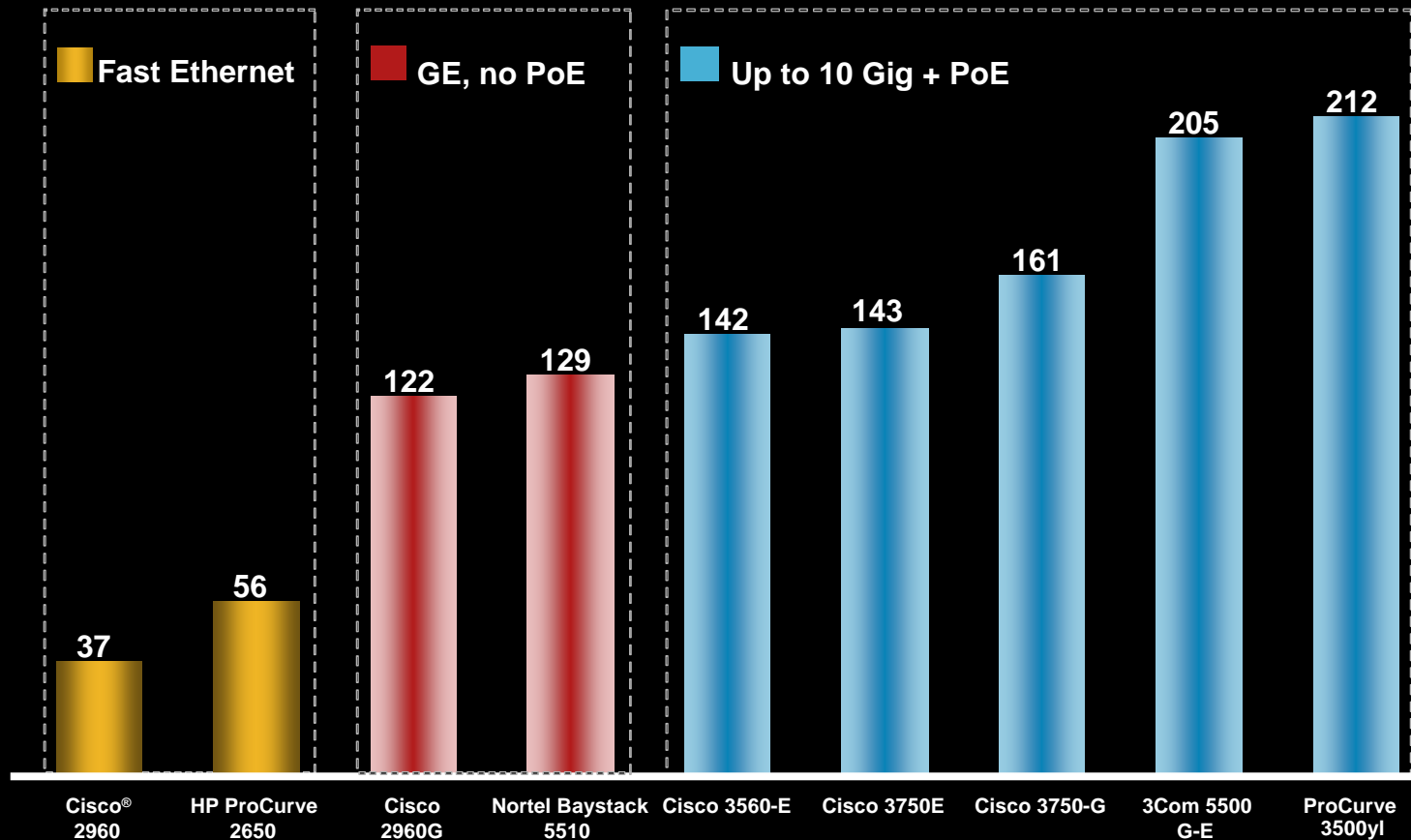


**KillAWatt**

- 5% and 100% throughput traffic generated
- Frame size sequence: 64, 128, 256, 512, 1024, 1280, and 1518 bytes
- Layer 2 and Layer 3 tested
- 1GE and 10GE tested
- KillAWatt is used to measure the power consumption for each device under test.

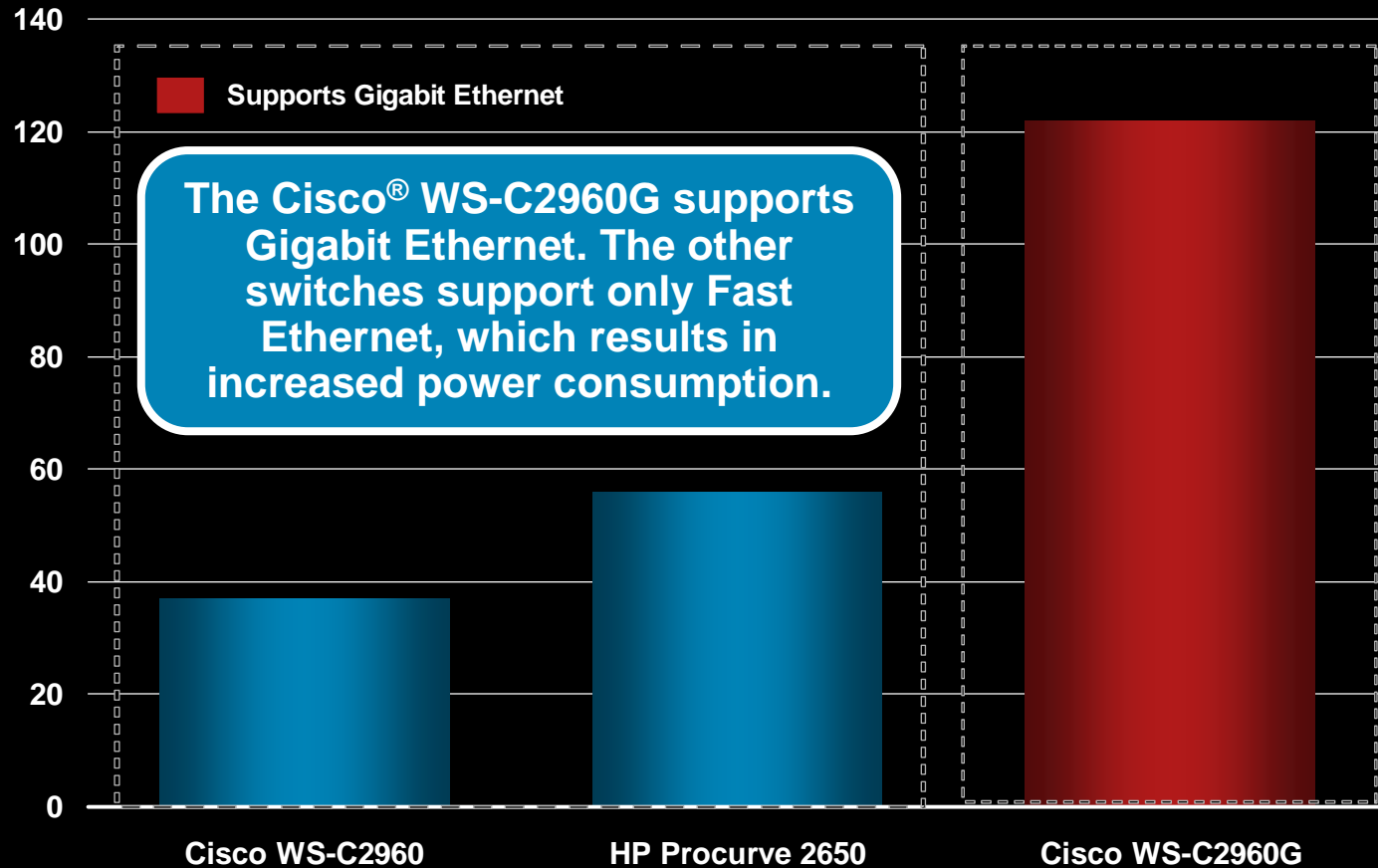
# Results: 100% Throughput

## Power Consumption at 100%



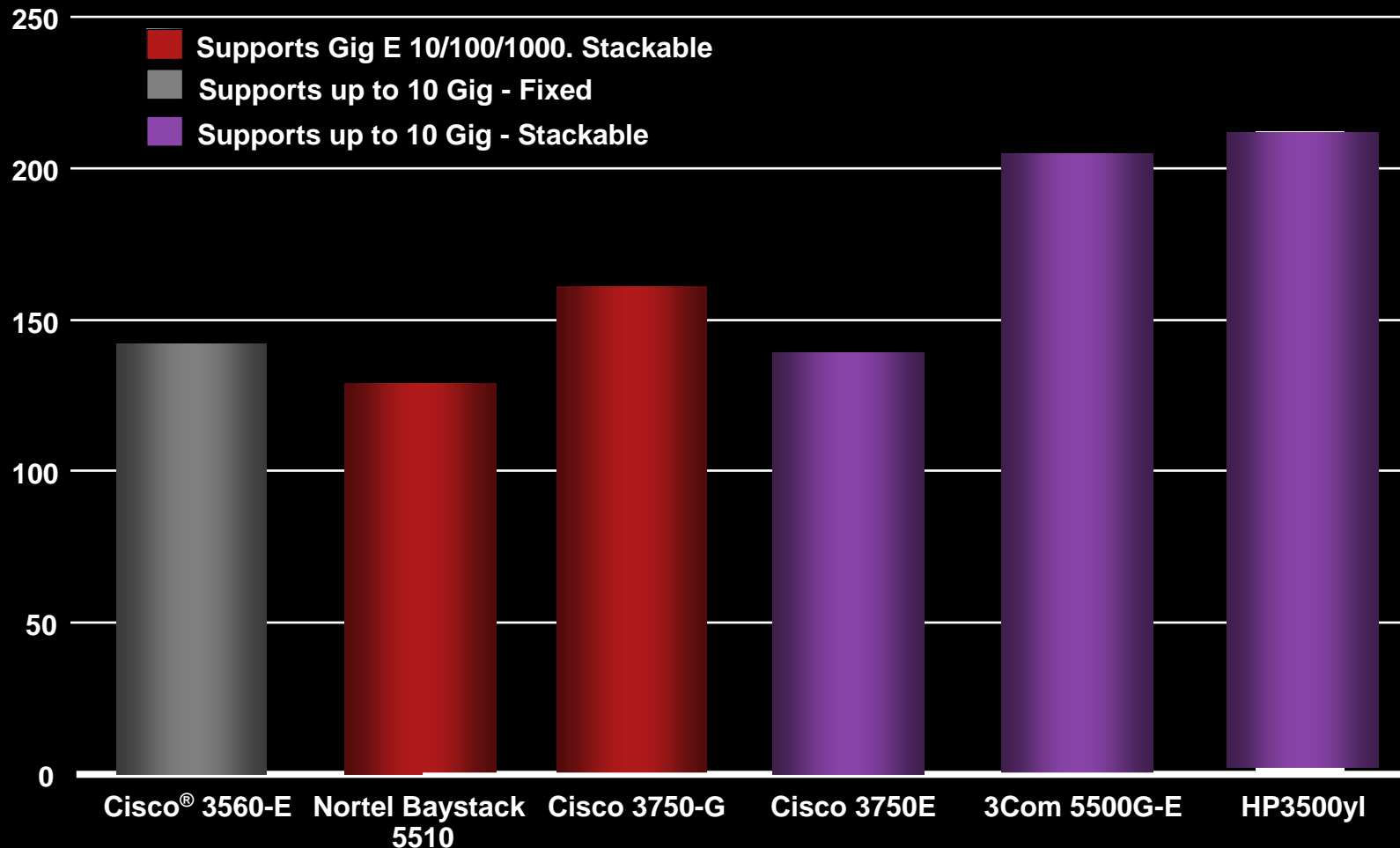
# Results: Layer 2 Switches

Power Consumption of Layer 2 switches at 100%

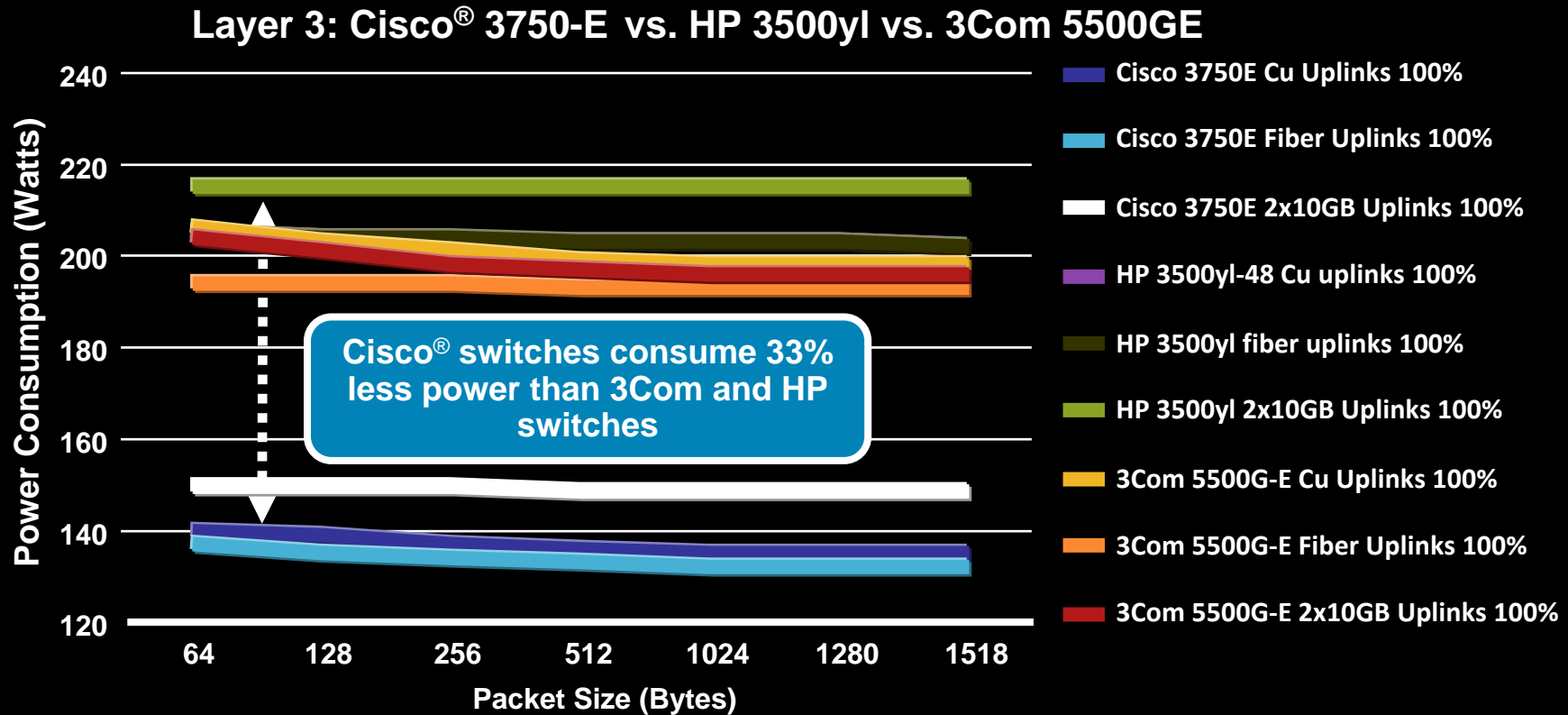


# Results: Layer 3 Switches

Power Consumption of Layer 3 switches at 100%



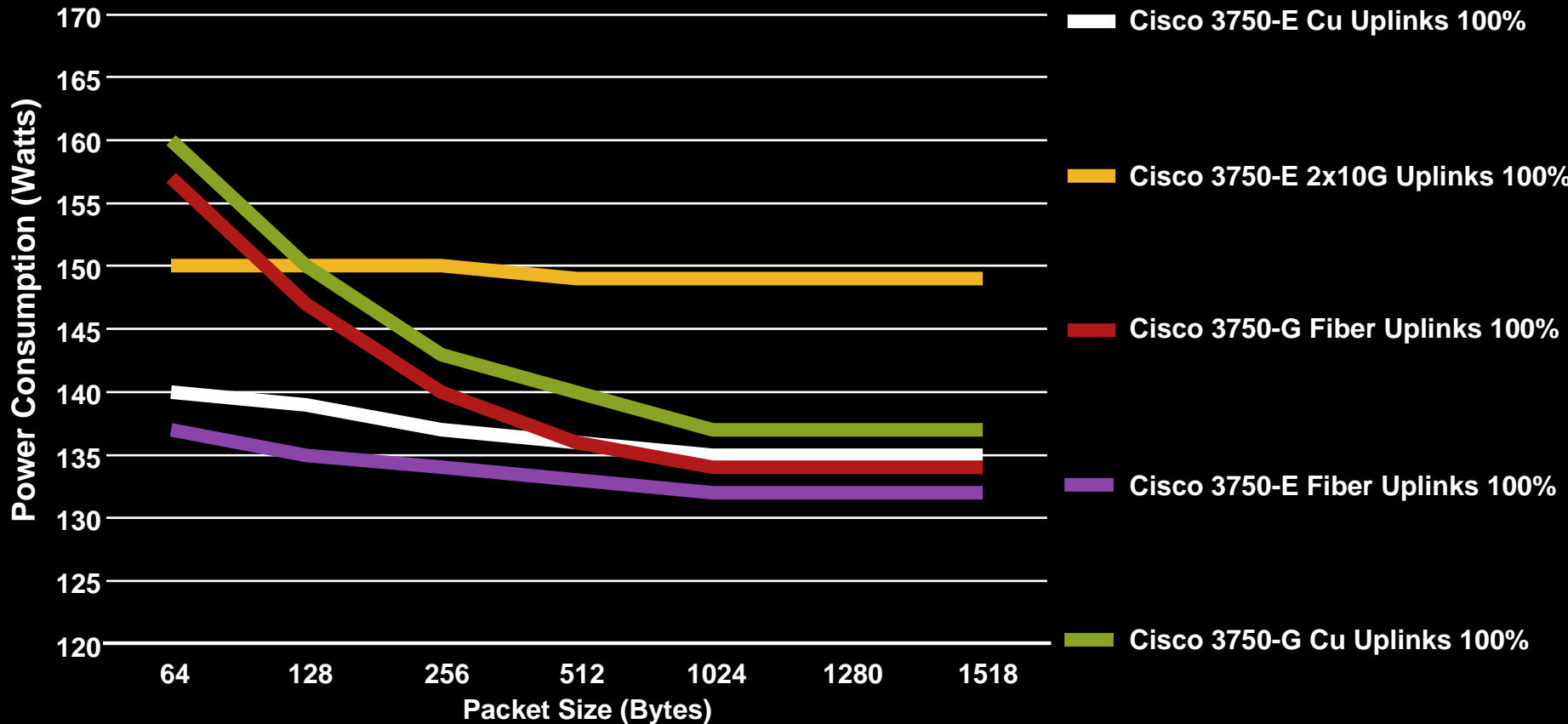
# Results: Layer 3 for Cisco, HP, and 3COM



The Continued Innovation in the Cisco® E Series is Proven Once Again

# Results: "E Series" Improvements

## Layer 3: Cisco® 3750-E vs. 3750-G Series



# Observation

## Financial Saving

### Comparative study

#### HP Procurve 3500yl

Power per switch	212 W
Power in a 3-switch rack	636 W
Heat dissipated in BTU (1 W = 3.41 BTU)	2168.76 BTU
Power consumed in cooling 1 BTU	0.105 W
Power consumed for cooling	227.71 W
Total power consumed by switch	863.71 W
Cost per Kwh	10 cents
Cost per day	\$2.07
Cost per year	\$ 755.98

#### Cisco® 3750-E

Power per switch	143 W
Power in a 3-switch rack	429 W
Heat dissipated in BTU (1 W = 3.41 BTU)	1462.89 BTU
Power consumed in cooling 1 BTU	0.105 W
Power consumed for cooling	153.60 W
Total power consumed by switch	582.60 W
Cost per Kwh	10 cents
Cost per day	\$1.39
Cost per year	\$ 510.36

**\$245.62 is saved per 3-switch rack by a Cisco switch when compared to a HP switch**  
**Over a 5-year period: \$1228.10**  
**1000 racks: \$1,228,100.00**

# Observation Continued

## Financial Saving...

- More use for energy expense

Run a PC and a 3750E at the cost of a HP 3500yl !

- Environmental Benefits

Reduce your Co2 emission by 55 ton.  
Decrease your carbon footprint





**CISCO**

**A Watt Saved  
Is A Watt Earned**