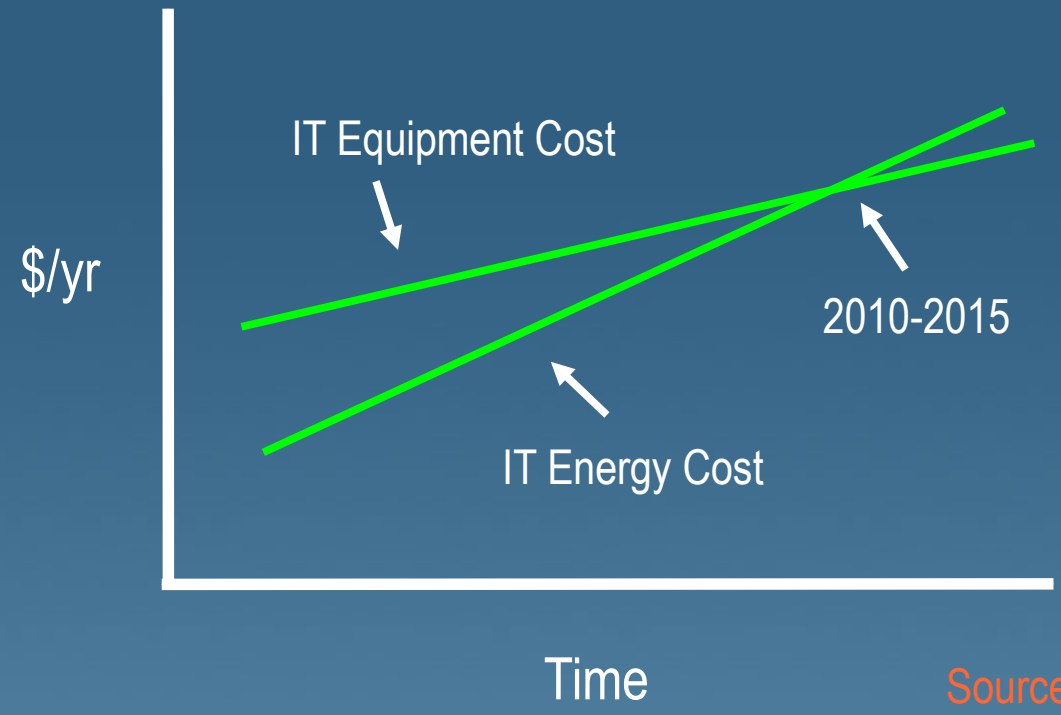
The long green tail and i0

Danny Cohen, DE
Sun Microsystems

<Danny.Cohen@Sun.com>

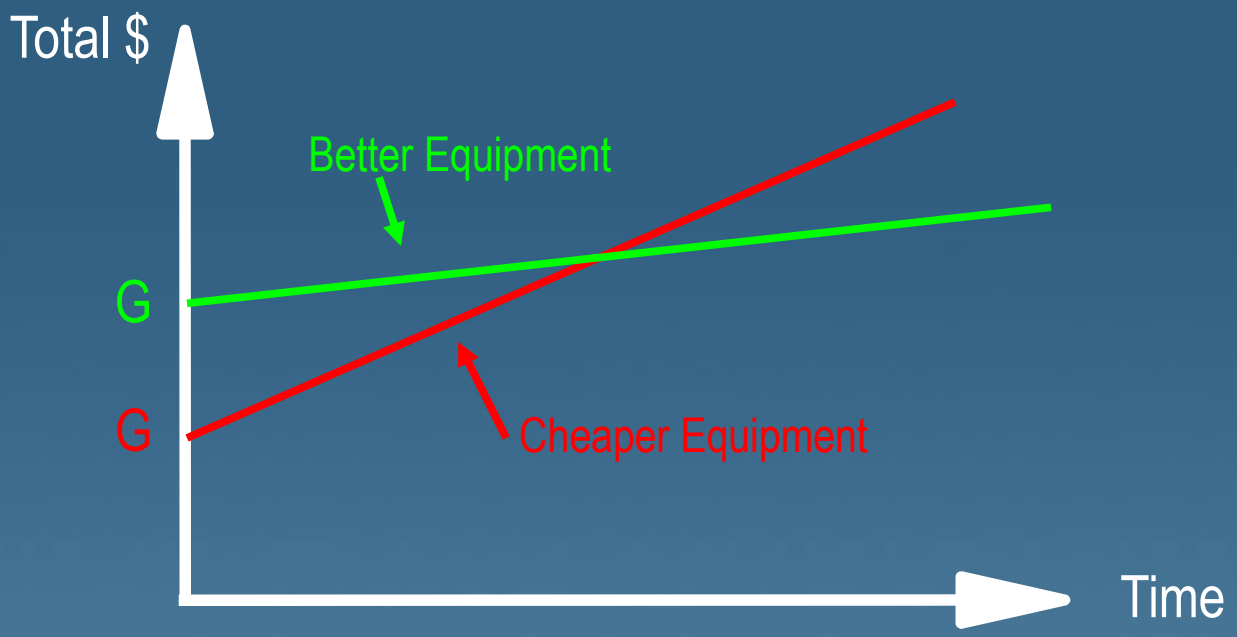
Economic Impact



Source: IDC

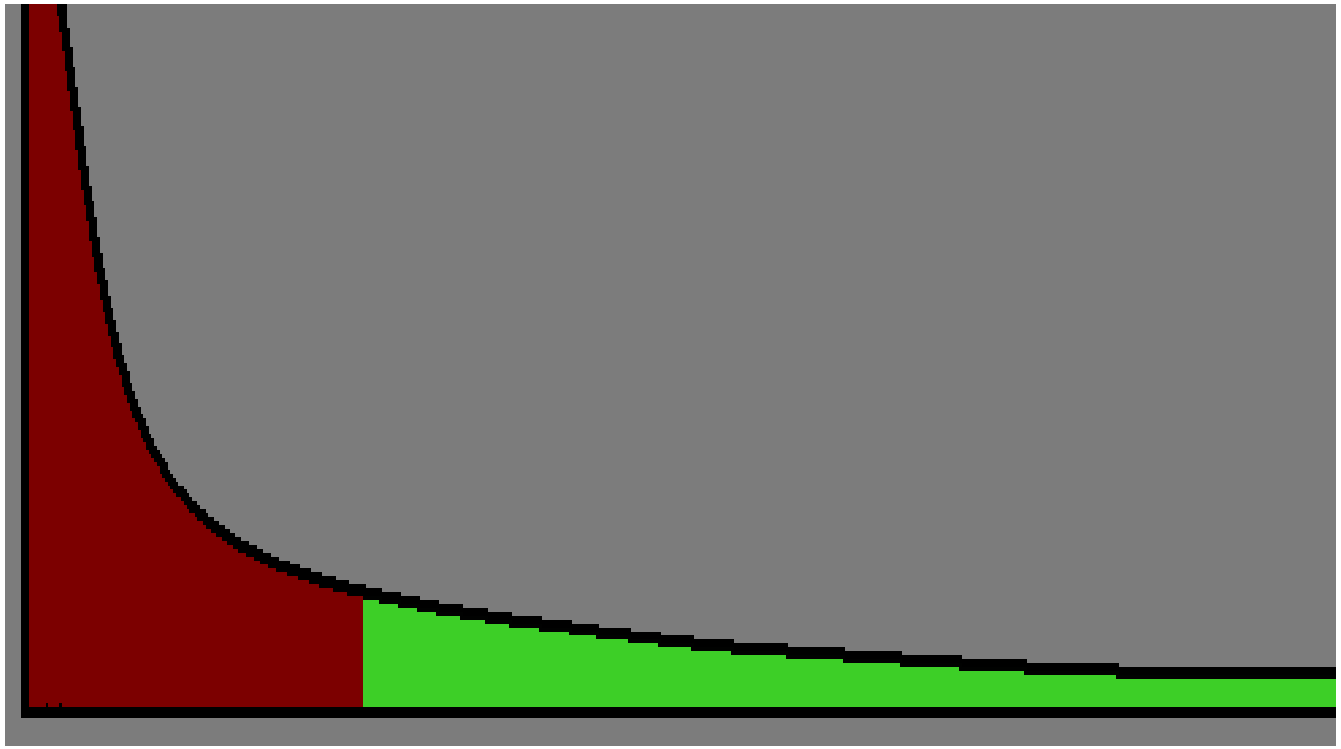
Increasing power density is shifting the balance of cost

Total Cost Over Time



$$C(T) = G + T * H(G) \quad \text{where} \quad H'(G)<0$$

There is a Long Green Tail



There are many ways to save energy

Light only where needed

Light only when needed

Light only when needed

Do as much cleaning work as possible during daylight

Reduce lights during off-time (weekends, holidays, and very late nights)

Cool/heat only where/when needed

Set the blinds as needed

SLHVAC Operation

HVAC Heat + Ventilation + A/C
LHVAC Lights + HVAC
SLHVAC Smart LHVAC

SLHVAC, thereafter “the system”

SLHVAC Operation

HVAC Heat + Ventilation + A/C
LHVAC Lights + HVAC
SLHVAC Smart LHVAC

SLHVAC, thereafter “the system”

The idea: Operate the system only where and when needed, and as much as needed

The Goal

The goal of the system is to provide comfortable env't at optimal cost (in $, CO2, ...)

Unfortunately, we cannot quantify comfort in order to have a simple optimization problem

The System

Interoperability is the top priority (not efficiency, performance, $$)

The system is both distributed and centralized

The system uses the heat generated by computers as yet another source of heat

Communication for the System

The system needs communication among its distributed sensors and actuators, using a variety of communication links, built by various manufacturers.

Hence, standards are needed for the system

Standards for the Systems

The system needs standards all the way from the physical level to the application level, including configuration parameters like Plug-&-Play and USB

i0, SunSPOTs, and motes are examples for links that can support the system.

SunSPOT

i0 for the System

Unlike the SunSPOTs and the motes that use RF links, i0 can use links of several technologies such as PLC, RF, I/R, and ultrasound

Mobil components need wireless links (IR, RF), stationary devices need batteries or PLC

i0 can handle all these links

Green Is Good For Business

"More companies understand that they can protect the environment and prosper"

GREEN IS GOOD BUSINESS