

GreenWay Collaborative

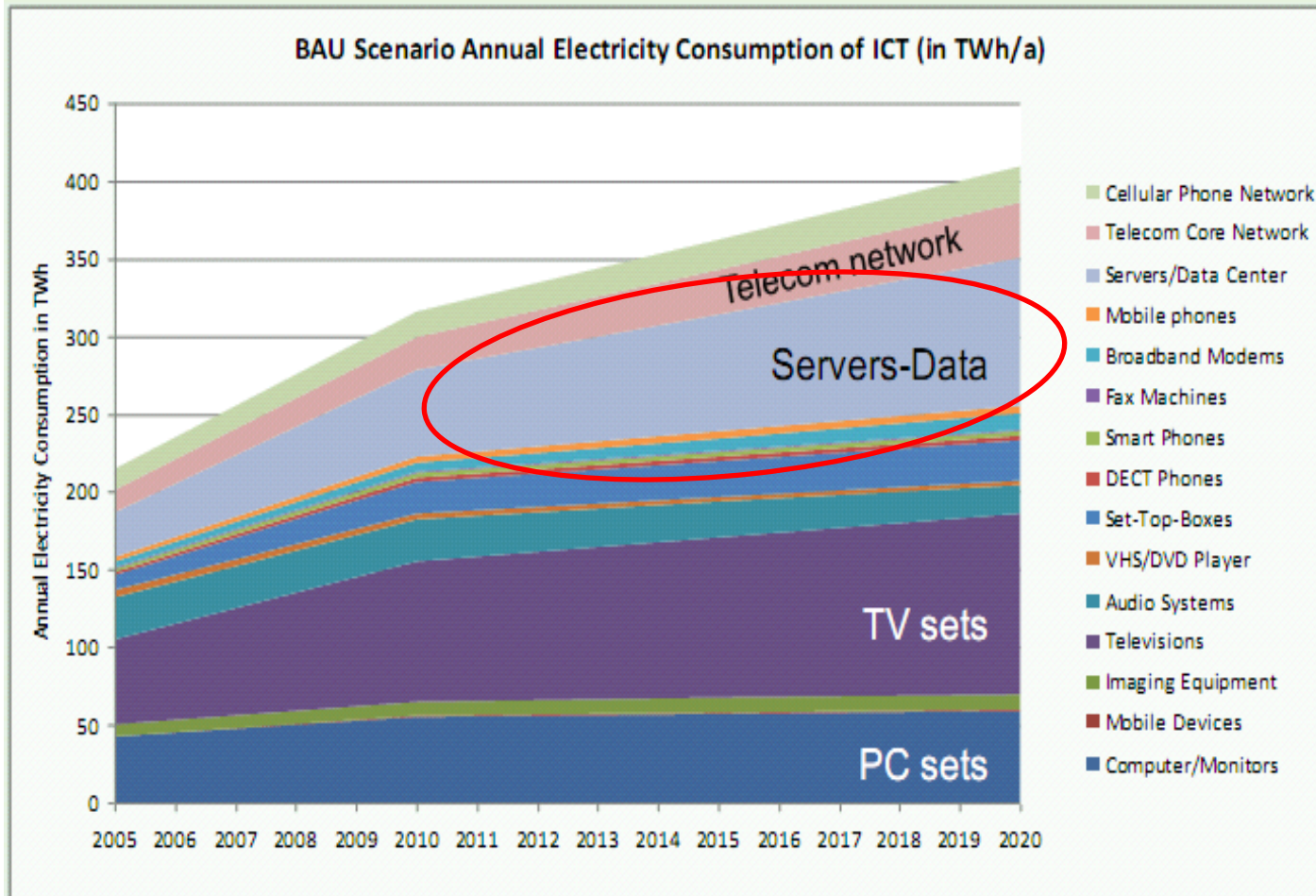
Knowledge Base and Research Report



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ICT ANNUAL ELECTRICITY CONSUMPTION



Total energy usage
EU Data Centers
2010 1.25%
of all power consumed in EU
2x by 2020
2020 2.7%



Source: European Commission Information Society and Media

ENERGY USAGE: PROXY FOR SAVINGS

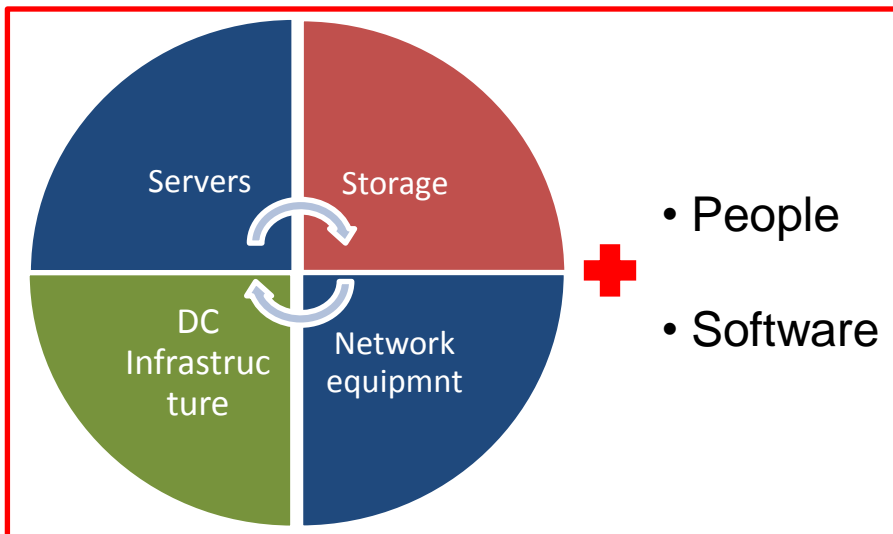


\$1 in energy savings



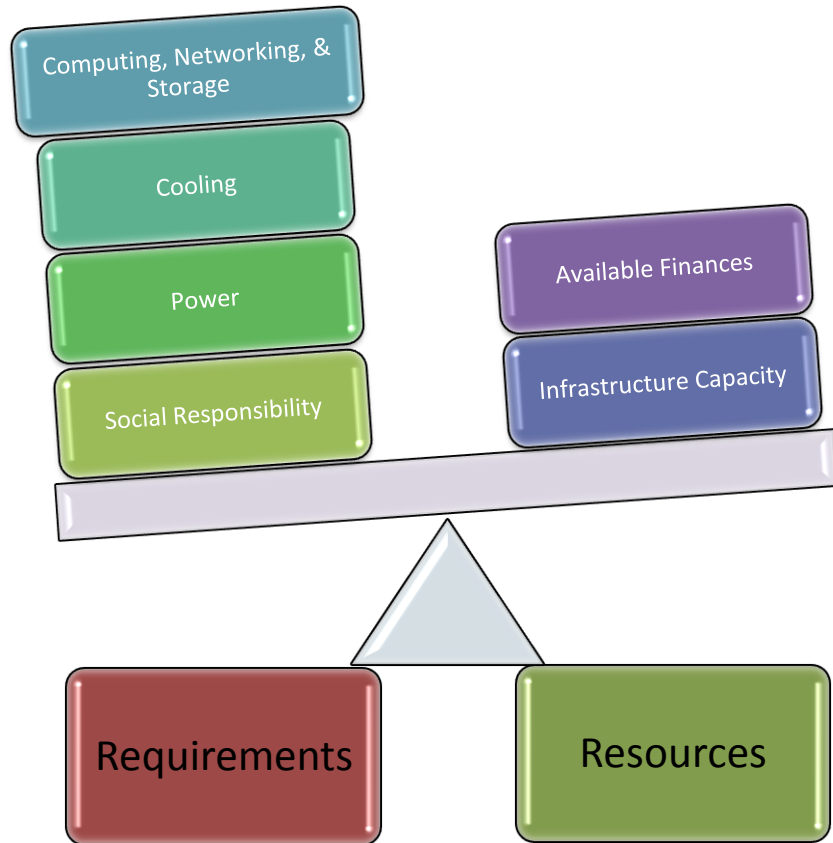
\$10 - \$15 total savings

- Studies demonstrate **energy costs** typically account for **10 percent** of data center savings when processes and resources are optimized.
- The largest savings are in **people costs** at **30 to 50 percent**.
- The second largest savings are in **software licensing and maintenance fees** at **20 to 40 percent**.
- The remaining savings are derived from hardware and floor space reductions.
- This **DOES NOT INCLUDE** the value process improvements bring to uptime.
- The number of data center operations jobs and the roles of those employees is permanently changing as enterprises move towards optimized, cloud-based infrastructures.



- People
- Software

DATA CENTER BALANCING ACT



On-site and online Tools will analyze current state and uncover opportunities for improvement.

- Data center landscape always in flux.
- Emerging and existing technologies.
- Velocity of change is increasing.
- Energy efficiency data , where it exists, is siloed.
- Data must be transformed into knowledge.

Requirements Dictate:



GREENWAY COLLABORATIVE OUTPUT

Monitoring

- What other data centers are doing.
- Aggregate data.
- IT provider trends.
- Power provider trends
- Cost trends
- Business and economic pressures.

Insight

- Provider trends
- Best practices
- Regulatory impacts
- Cost allocations and comparisons
- Geographic variances
- “What if” scenarios

Control

- Modeling
- Benchmarks
- Metrics
- Current state and trend analyses

Action

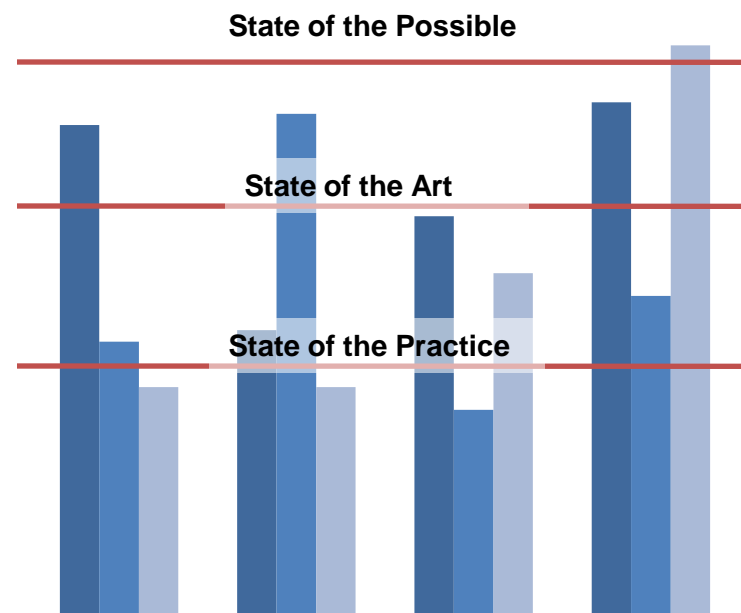
- Planning inputs
- “What if” alternative impacts
- ROI and TCO analyses
- Report supporting materials



ASSESSMENT

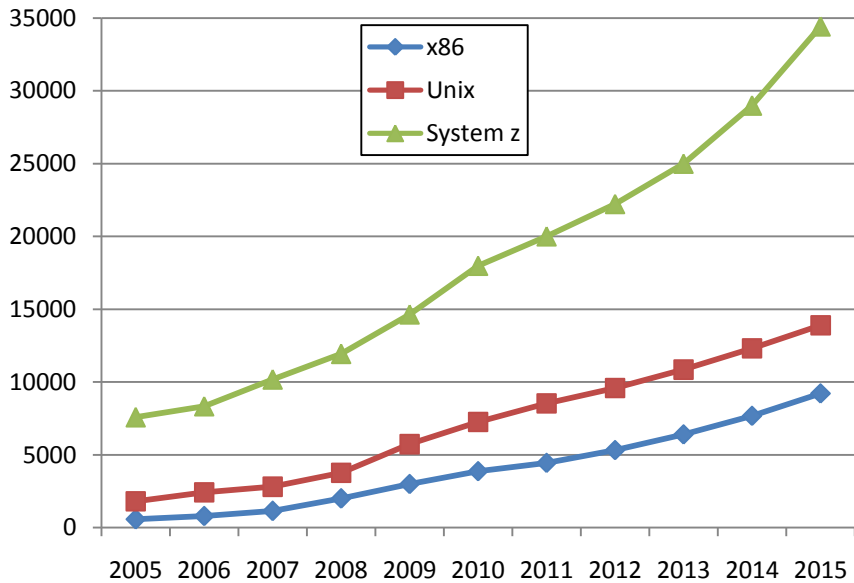
PERFORMANCE METRICS

- Key Metrics:
 - PUE/DCIE
 - Transactions per watt & per sq ft
 - Energy consumption per workload & per sq ft
 - Asset utilization rates
 - Relative efficiency across platforms
 - Energy cost per MIPS/GHz & per sq ft
 - Administrator Ratios
 - Power & Cooling Efficiencies
 - Virtualization Ratios
- Key Metric Dependencies:
 - Platforms
 - Age
 - Refresh Policy
 - Workload: Avg/Peak Utilizations
 - Growth Rates: System/Workload
 - Operational Practices
 - Energy Costs & Sources
 - Management Software : Energy Optimization

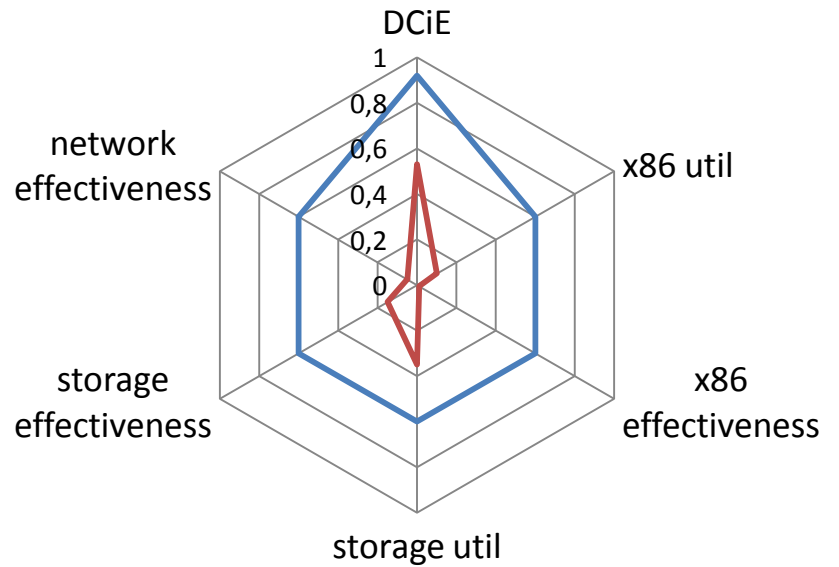


METRICS

Server Transactions Per Watt



Other Key Metrics



— Best of Breed — Average

Users and vendors can greatly improve these results.

EFFICIENCY ANALYSIS → → → DC TUNING

Energy Assessment



Immediate Deliverables

- Baseline Analysis
- Benchmarking
- Resource Transparency

Actionable Items

- Identification: Poor Performance and Hot Spots
- Efficiency: Infrastructure Upgrade and Replacement
- Implementation of Best Practices
- Planning: Cost and Control

Long-Term Enablement

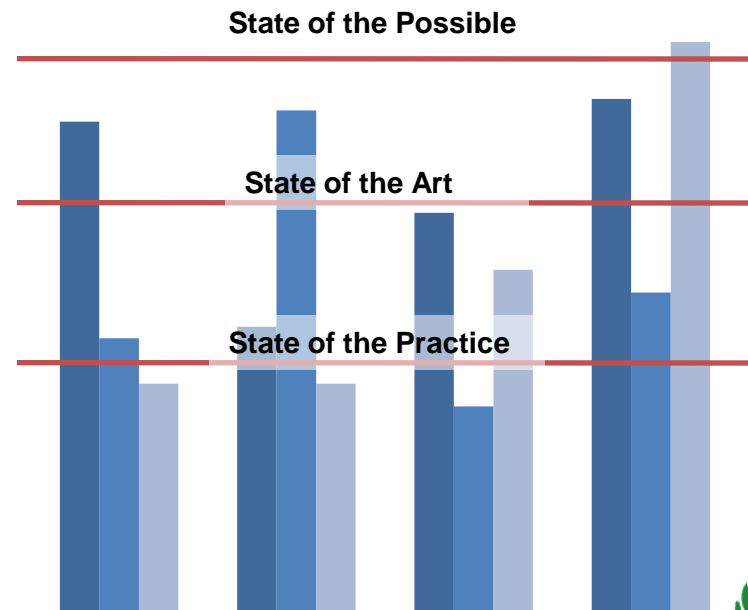
- Avoidance/Delay of New Data Center Construction
- Strategic Decision Making



GREENWAY
COLLABORATIVE

NEUTRALIZE THE GROWTH

- Measure and monitor power consumption
- Reduce number of servers and increase utilization of virtual servers and storage
- Eliminate over-provisioning
- Optimize refresh cycle
- Cut waste
- Improve capacity planning
- Employ power management
- Optimize airflow, humidity, and temperature
- Benchmark against peers



END

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