ICT ANNUAL ELECTRICITY CONSUMPTION

Source: European Commission Information Society and Media

Total energy usage
EU Data Centers
2010 1.25%
2x by 2020
2020 2.7%
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.
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:
Monitoring → Insight → Control → Action
**GREENWAY COLLABORATIVE OUTPUT**

<table>
<thead>
<tr>
<th>Monitoring</th>
<th>Insight</th>
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| • What other data centers are doing.  
  • Aggregate data.  
  • IT provider trends.  
  • Power provider trends  
  • Cost trends  
  • Business and economic pressures. |
| • Provider trends  
  • Best practices  
  • Regulatory impacts  
  • Cost allocations and comparisons  
  • Geographic variances  
  • “What if” scenarios |

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<tr>
<th>Control</th>
<th>Action</th>
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| • Modeling  
  • Benchmarks  
  • Metrics  
  • Current state and trend analyses |
| • 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
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
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