

# Green Data Centers

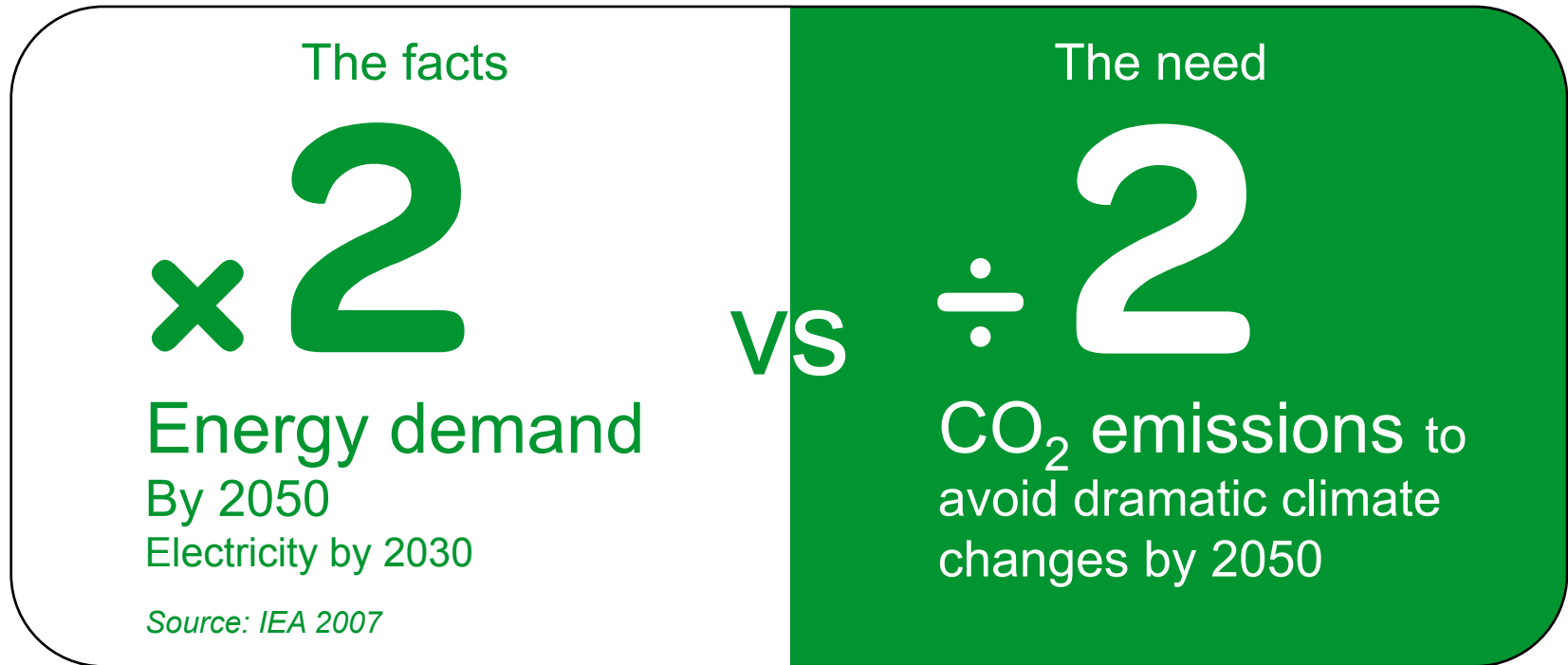
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# The energy dilemma: “With Me, Without Me”



**Frequent  
power outages**

**Uncertainty in  
energy prices**

**Climate change**

**Conflicts for  
resource access  
& control**

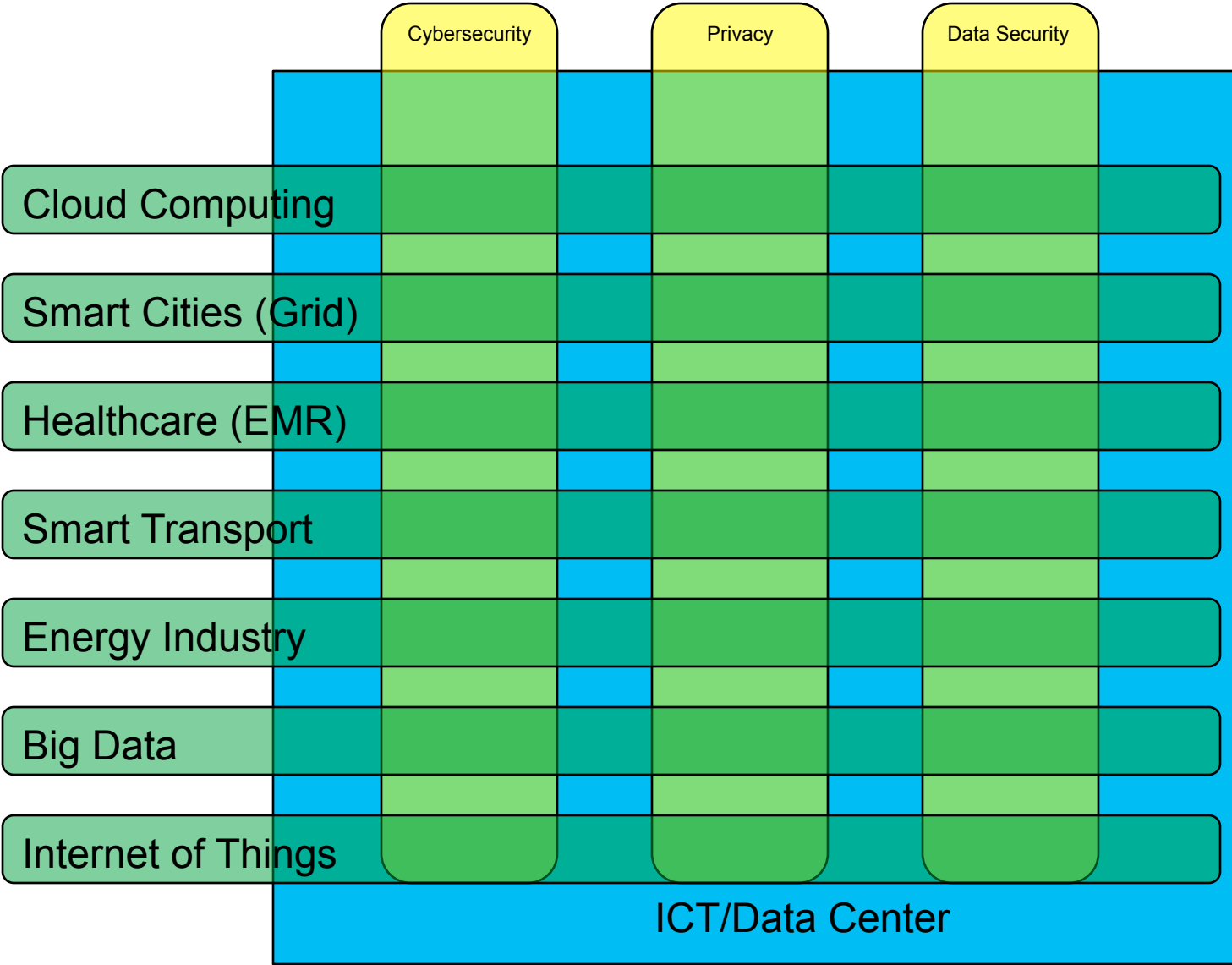
# Executive Summary

- Data Centers deliver tremendous computing power, services, and productivity cost effectively.
- The environmental impact of data centers prove difficult to rationalize from an individual point of view. Societal access to information is currently ubiquitous and immediate; and that availability is only a mouse click away.
- The “Greening” of Data Centers is a journey, not a destination, it is the result of continuing innovation, and broad vision
- Projections:
  - The number of data centers is expected to grow 2X by 2020
  - The rate of managed data is expected to grow 4X by 2020
  - Power generation from fossil fuels and Nuclear is expected to decline by 35% to 45% over the next two decades
    - Renewable energy will NOT make up the difference

# Policy Implications

- Global governments are driving policy to take advantage of compelling advantages and productivity offered by the availability of information and communications technology
  - The cost of that availability is resource
    - Energy (Carbon)
    - Water

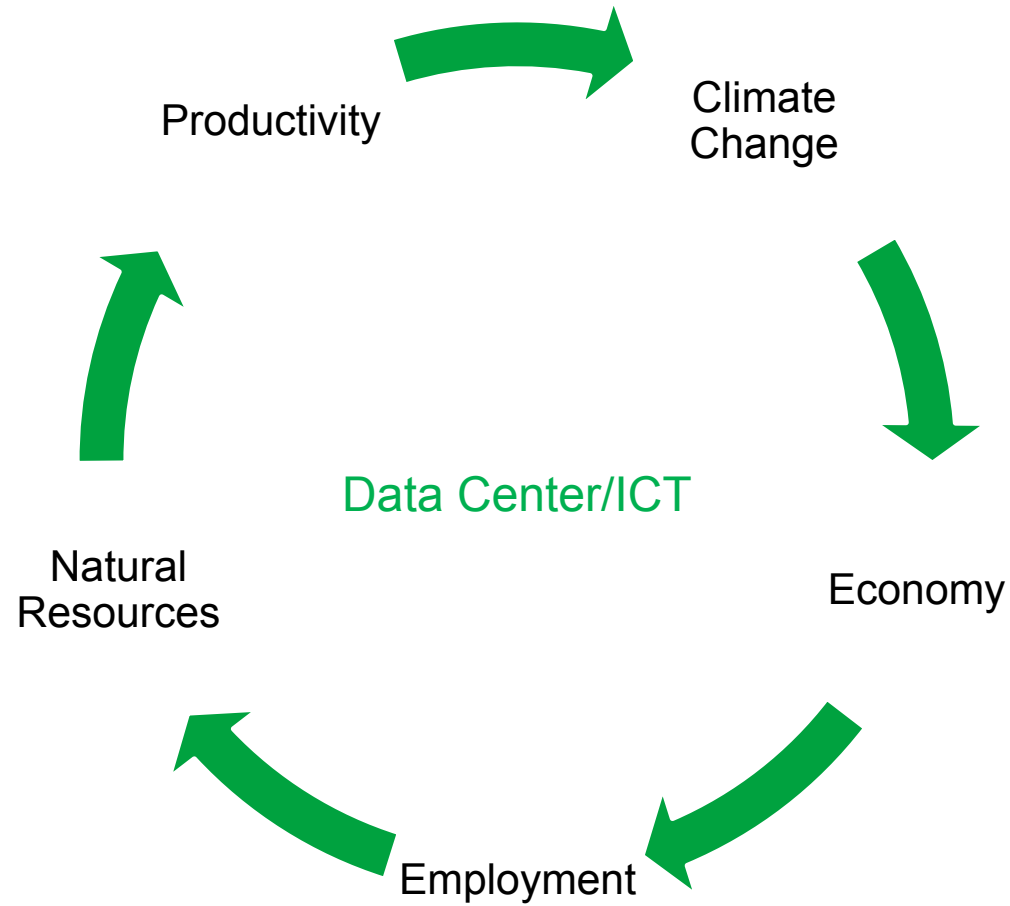
# Policy Driving ICT/Data Center Utilization



# Definition

- A sustainable (Green) data center is a facility for the development, storage, management, and dissemination of data in which; mechanical systems, lighting, electrical, information and communications technology systems are designed for maximum resource efficiency and minimum environmental impact. Construction and operation of a sustainable data center includes advanced technologies and strategies, such as;
  - Optimized building footprint and data center automation
  - Integrated cooling; power management and building control systems
  - Waste material recycling
  - Alternative energy technology (photovoltaic, heat pump, wind power)
  - On site large scale energy storage
- Data Centers Must Be Viewed within the Context of the Economy and Environment
- Green Data Centers Enable the Economy and the Environment

# The Perfect Storm



# What Does it Mean to Be Green?

- Sustainability reflects environmental, individual, and economic issues.
- Continue the trend of more IT technology/capability, less cost, over time
- Manage infrastructure optimized to consume less resource over time
- Sustainable data center's endure, minimize environmental impact, supportable, adaptable, and cost effective over time
  
- Deliver to the ICT industry's mission to be the “greener” alternative
  
- Deliver innovation and alternatives for a greener economy



# Moving Forward On Green Data Centers

- Clear Roadmap for Data Center Metrics Development
  - Tools Availability
- Integrated Data Center Management and Facilities Automation Tools
  - Tools That Clearly Identify IT Versus Facilities Issues
- Optimized Sensors and Measurement Apparatus
  - Communications and analysis tools
- Key Performance Indicators That Identify Optimization for Data Center Performance
  - Enable Measurement of the Pulses of Data Center Operations
- Useful Work Performed and Utilization Per Unit Energy Measurement

# Sustainability Of IT

- Energy Consumed by ICT/Data Centers – 1.5 to 2%
- Energy Consumed By The Economy – 98 to 98.5%
- Green Data Centers Enable Efficiency in the Economy
- Energy Saved by Utilizing Data Centers - ??%

# Going Forward Globally

- Building sustainable data center's should not be focused on climate change agenda, political movements or creating a press releases
- Focus should be placed on smart, sustainable, well thought out investments that are supportable, and optimize operating costs. The goal should be an Optimal Blend of Operating Expenses and Capital Expenses
- Making smart, sustainable investments utilizing ICT to “Optimize” the economy to employ resources for improved environmental impact

# Make the most of your energy™



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