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Business drivers and opportunities in Green ICT

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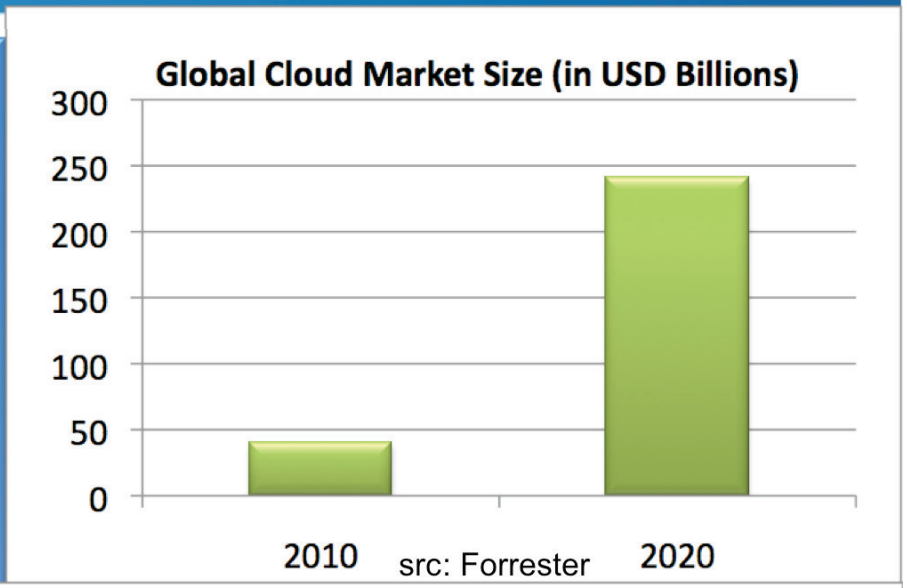
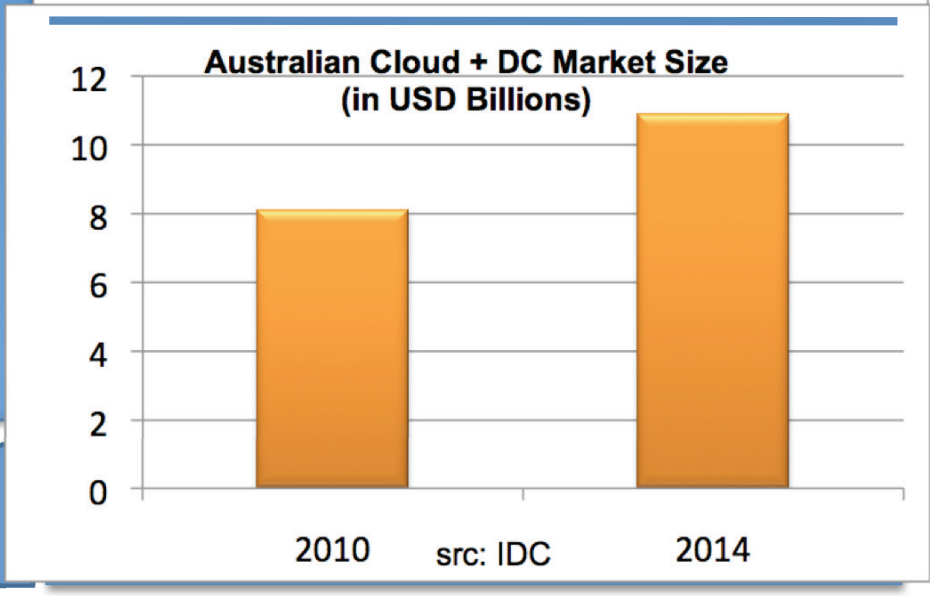
Growth in Cloud and Datacenters

- Digital economy is growing
  - Cloud migration of media content
    - By 2020, data to be 35 trillion GB
  - Data center (DC) + Cloud market poised to grow
    - Six-fold increase globally by 2020
    - 35% increase in Australia by 2014
- National Broadband Network (NBN)
  - a key driver and backbone for the digital economy

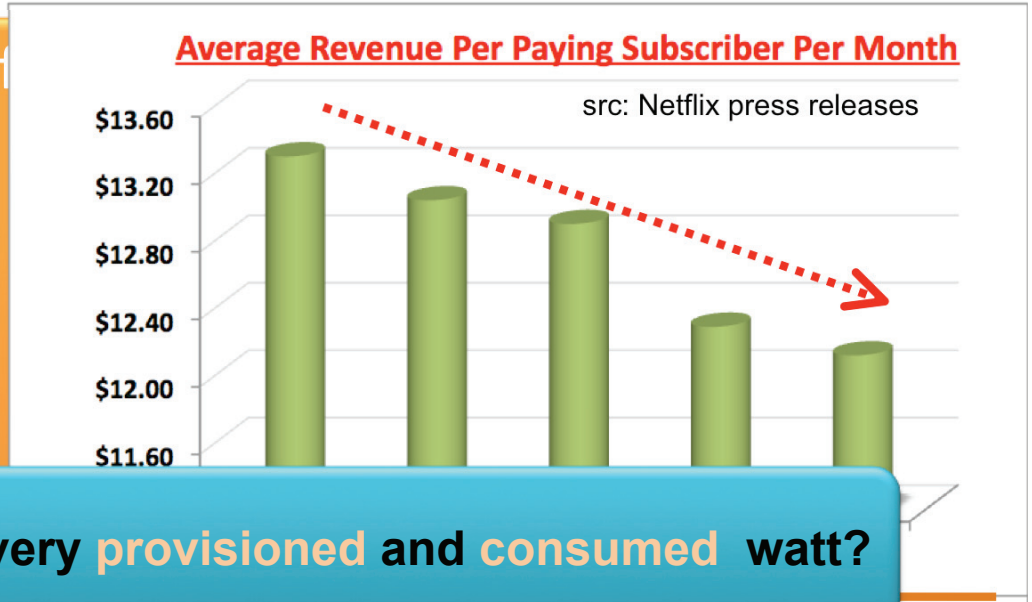
TELCOs need to provision for more hardware capacity and accessibility.



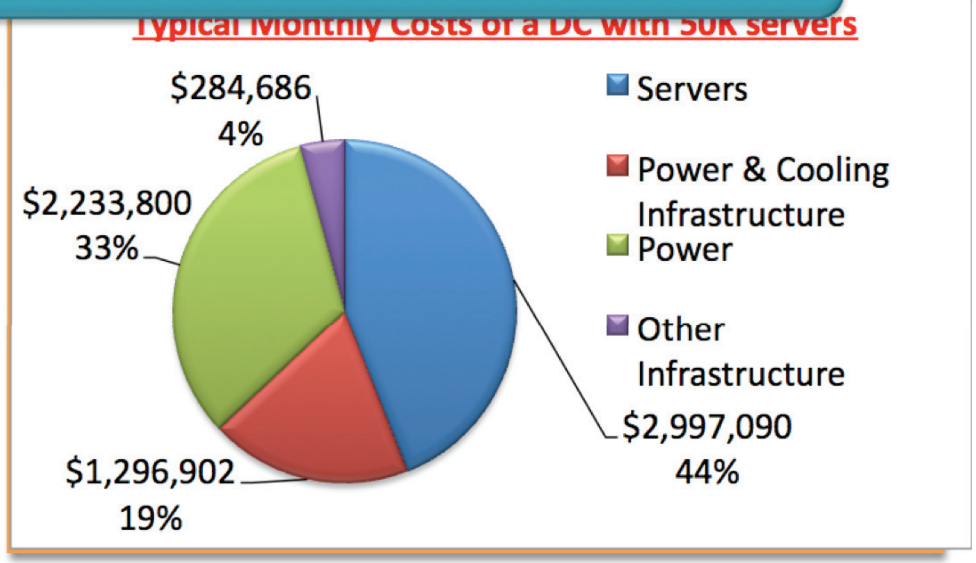


Shrinking Margins: Pressure on providers/enablers

- Revenue and cost dynamics of content providers
  - Netflix's ARPU declined by 8.9% between 2009 and 2011
  - revenues to record labels
- Consumers are demanding more for less!

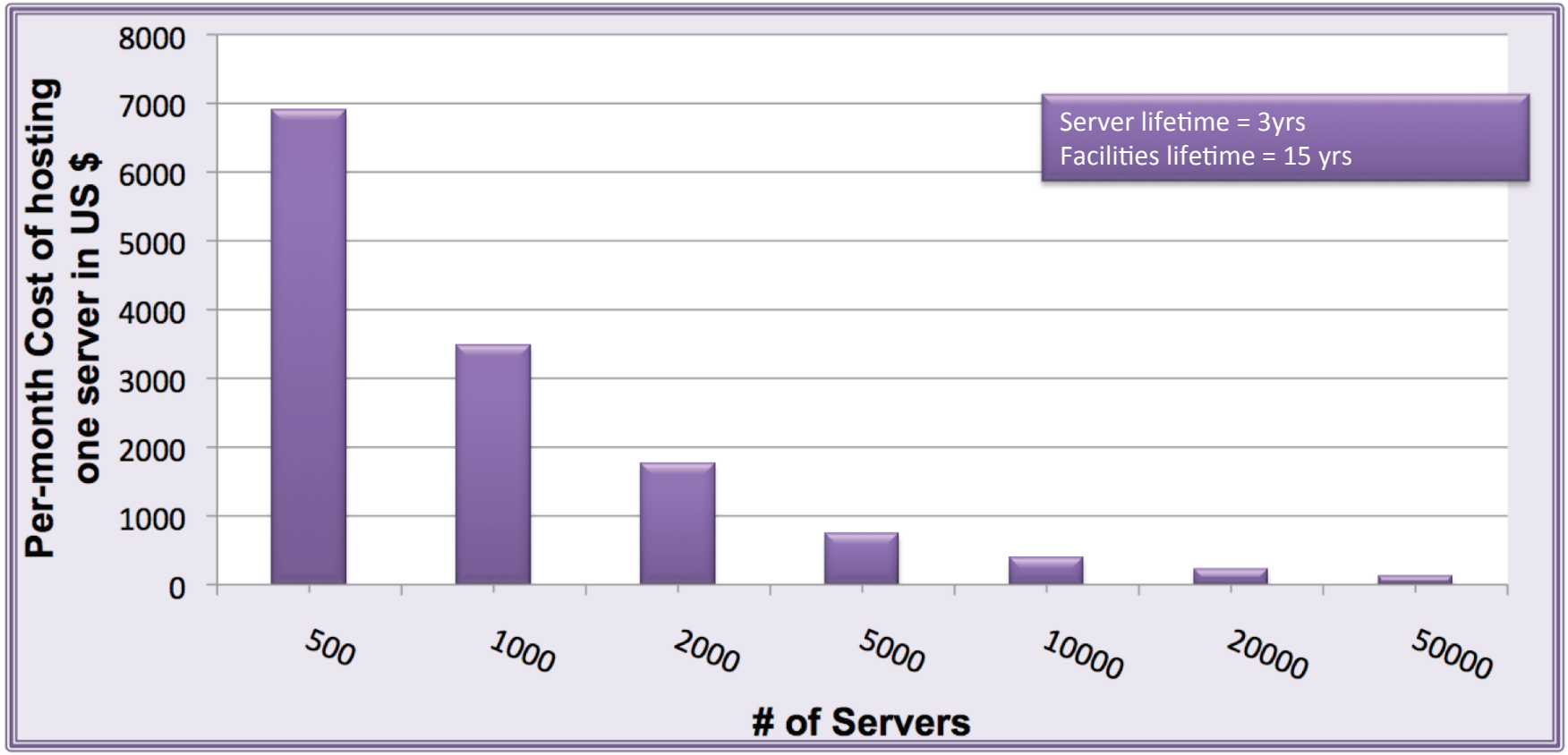


How do we get the most out of every provisioned and consumed watt?



Need a Highly Optimized and Agile Datacenter

Getting the most out of Datacenter Infrastructure



Need to Leverage Economies of Scale

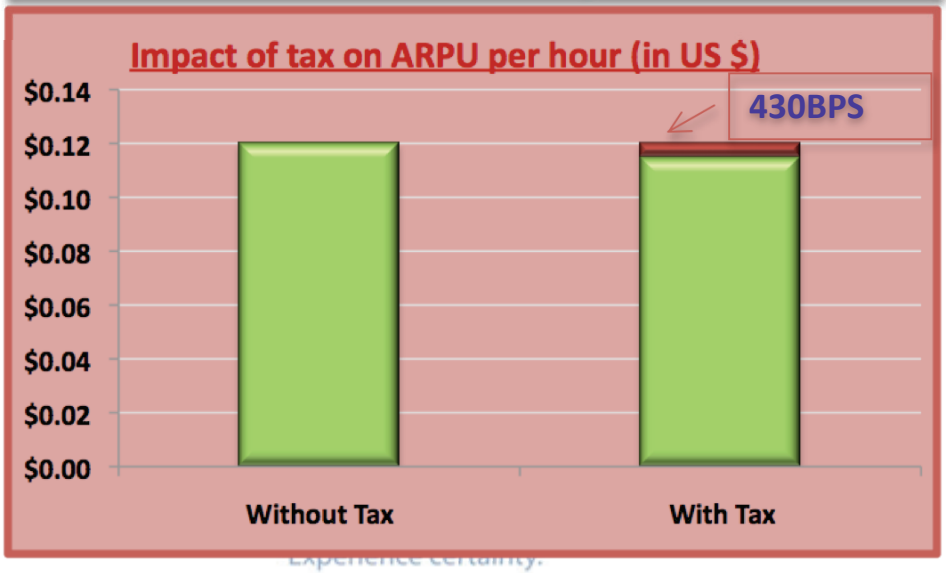
Impact of Carbon Tax

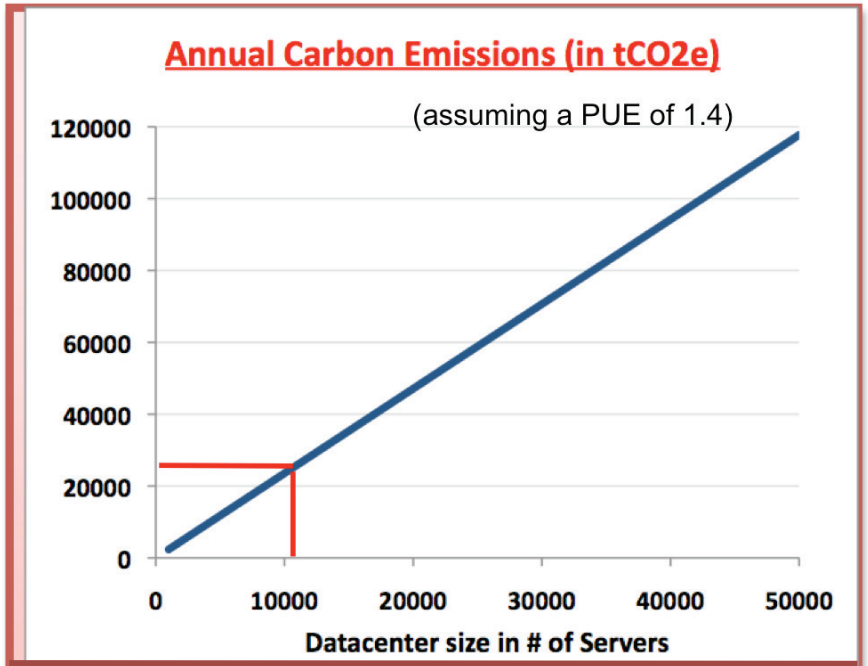
Australia's carbon tax: AUD 23 per tonne

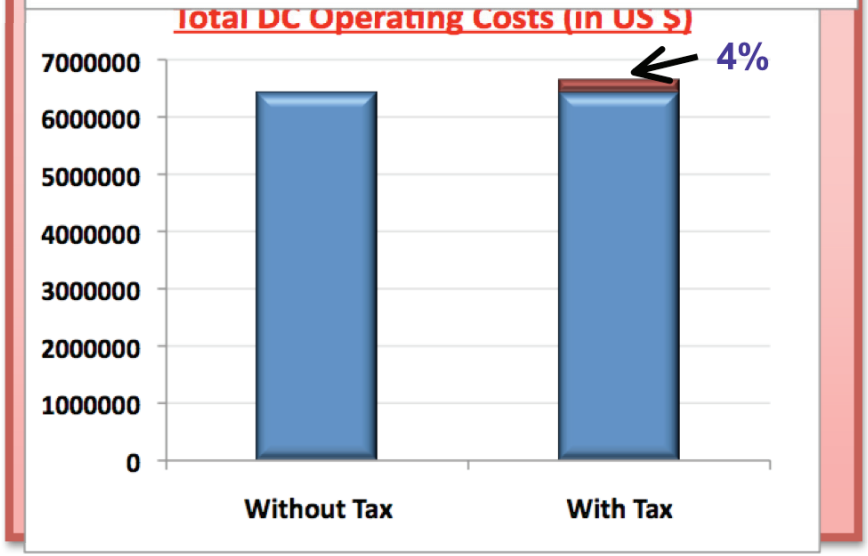
for facilities emitting > 25000 tCO2e

Fall-outs

- Leveraging economies of scale??
- Hit on margins and operating costs
- Moving DCs elsewhere?
  - New Zealand is a 'Top 10' DC location

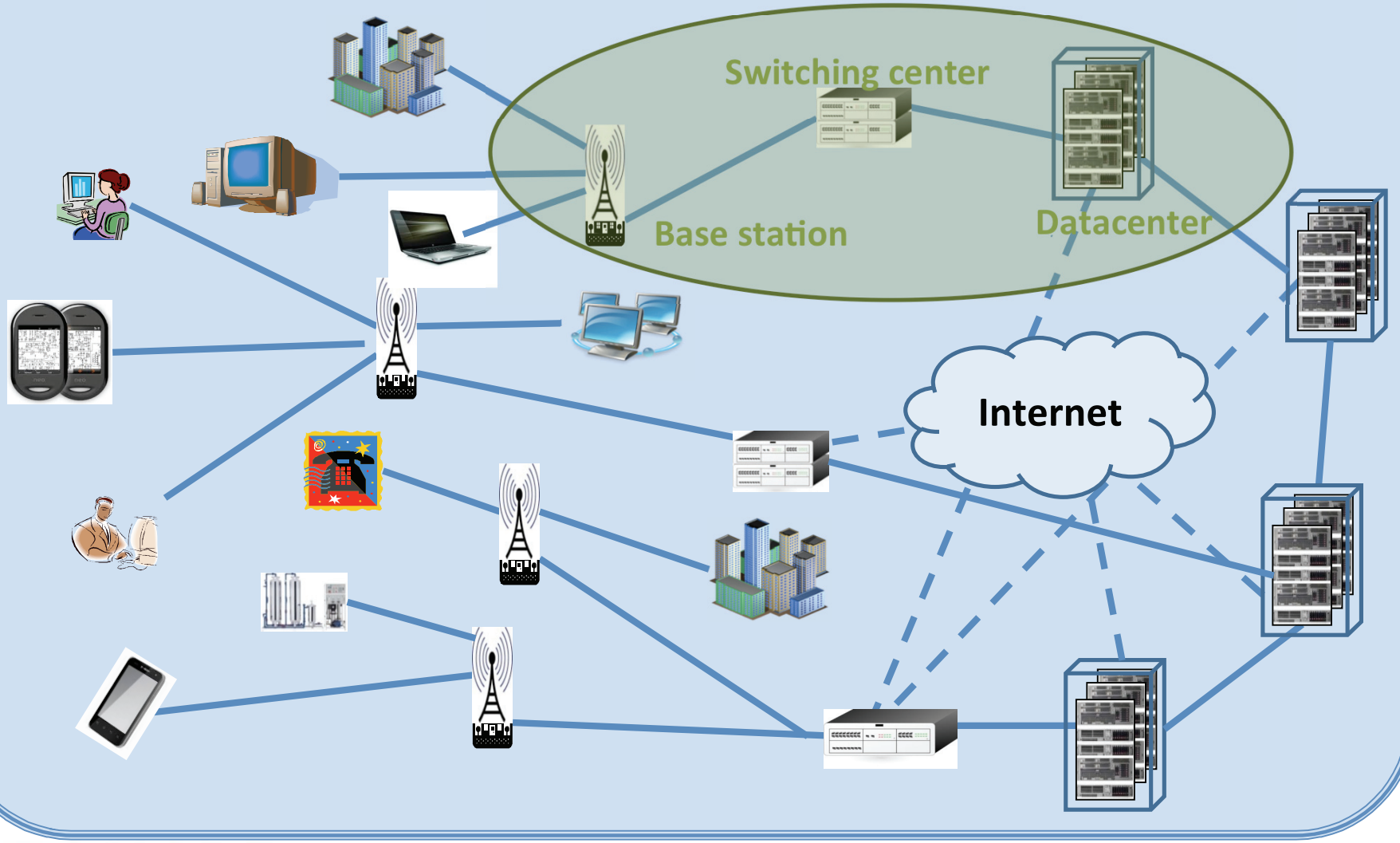






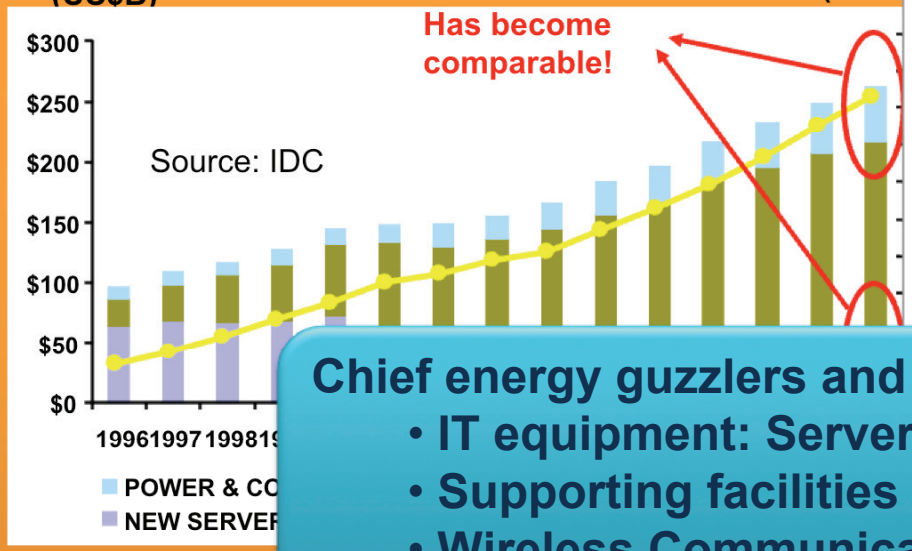
Efficiency + Sustainability = Higher Margins

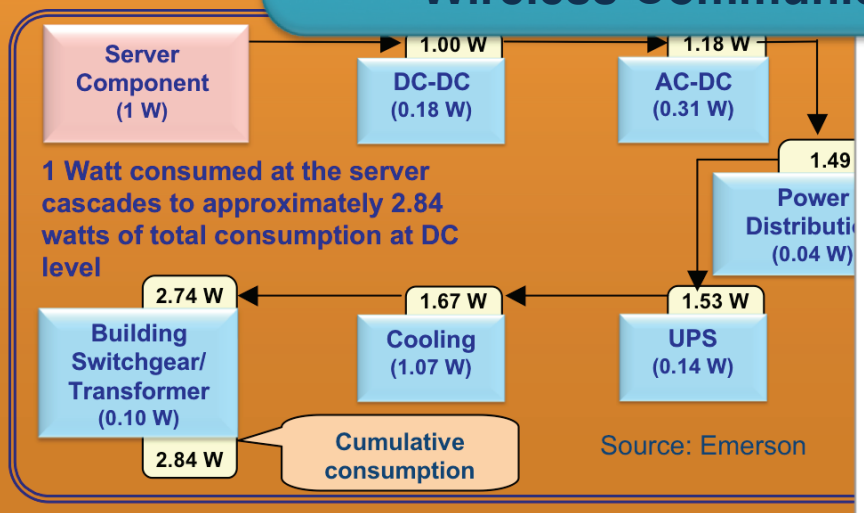
Candidates for saving energy in the network



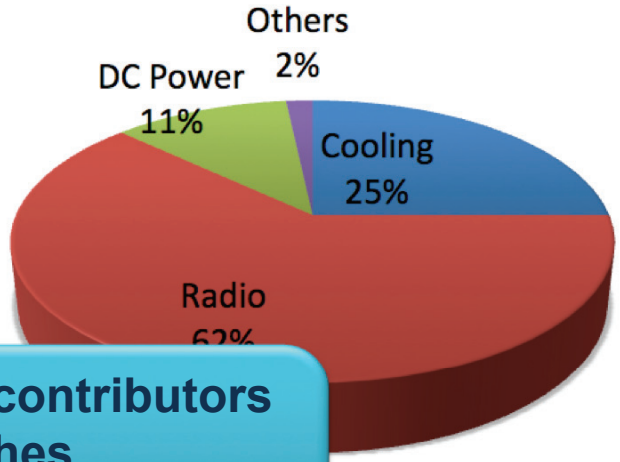
Energy Consumption @ Datacenters, Switching centers, Base Stations

Data center Power costs





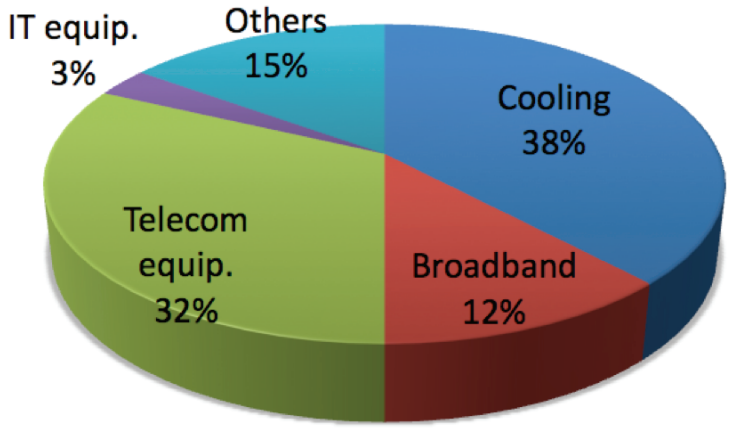
Power Consumption in Base Stations



Chief energy guzzlers and carbon contributors

- IT equipment: Servers, Switches
- Supporting facilities
- Wireless Communication: Radios

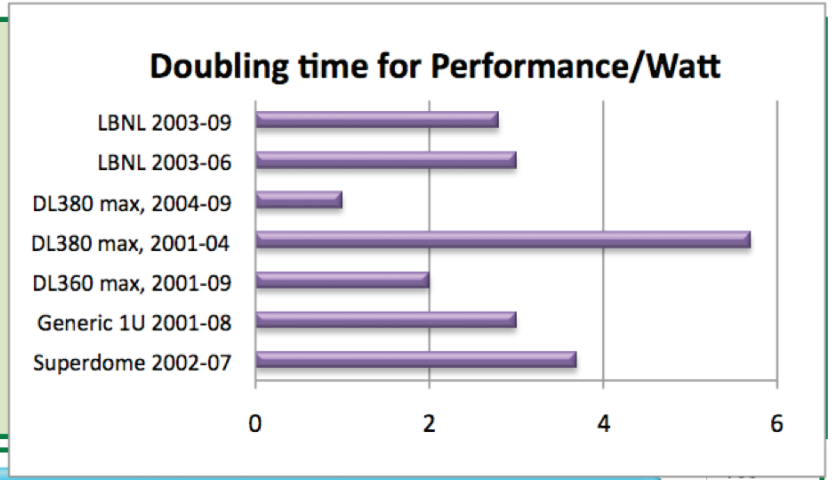
in Switching Centers



Greening IT: Servers and Switches

Continuous Refresh

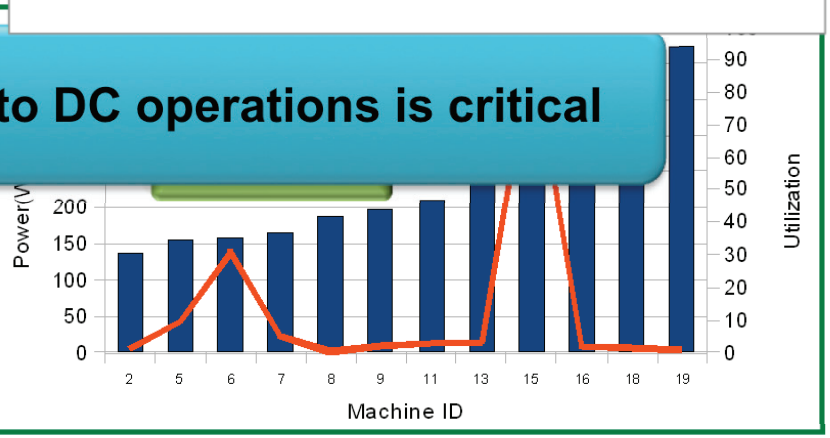
- Leverage the improvement in 'performance per watt' of hardware
- Cost – benefit analyses
- When, what to refresh?



Righ

- Wh
  - Identification and packing

Awareness and real-time insights into DC operations is critical

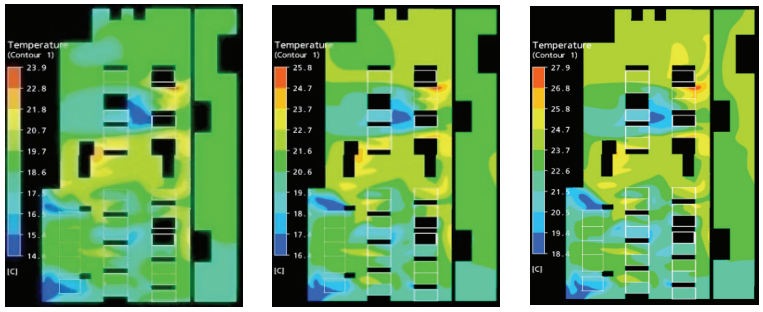


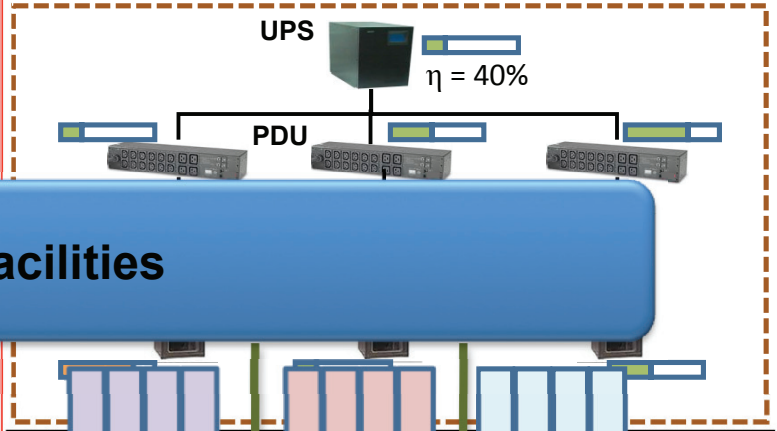
Workload Shaping

- Duty-cycling, Power state modulation
- Impact on SLAs and operations have to be considered

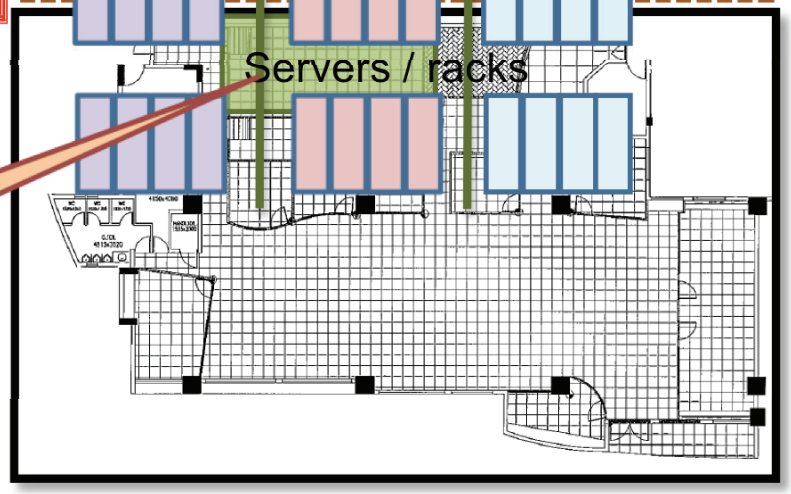
Power Reduction Options	IT power	Cooling power
No virtualization. Consolidate all twelve servers on server 18	23%	28%
No virtualization. Consolidate all twelve servers on servers 18,16	20%	24%
No virtualization. Consolidate only seven servers on server 18	15%	18%

Greening IT Facilities





Don't ignore the facilities



Modular growth of Data Centers

- Modularity in real-estate and PDN elements
- Iso-PUE growth

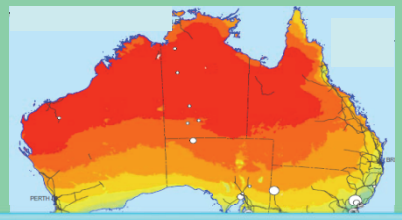
Datacenter

Greening base-stations through Renewables

- Powering base-stations
  - Electricity grid + Diesel backup
- Dependency on grid and fossil fuels
- Can we go green and off the grid?
- Wind/solar plants
  - Solar in central Australia
  - Wind in coastal Australia

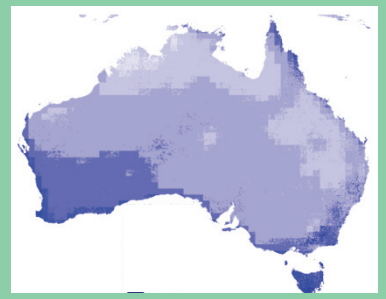
Annual Solar Insolation

src: Bureau of Meteorology



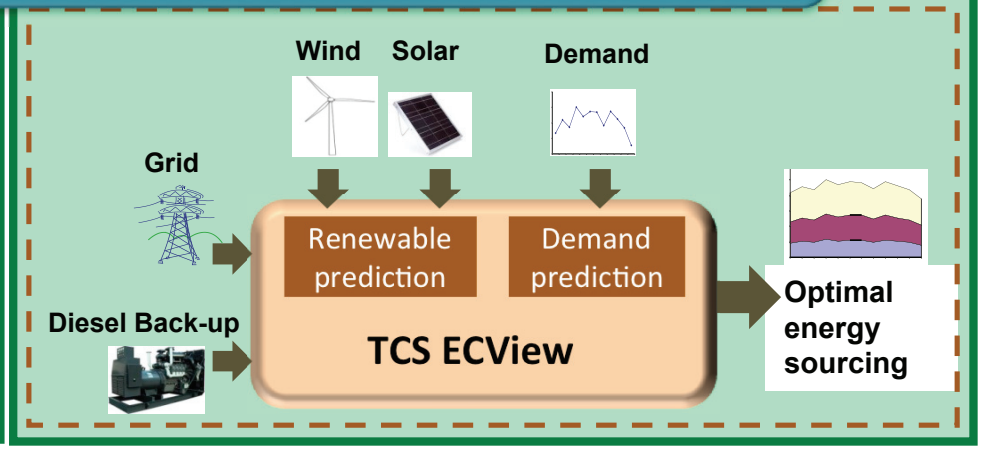
Wind speeds in Australia

src: Univ. of Queensland



Don't ignore the sourcing options

- Issues to consider
  - A wind-solar hybrid?
  - Plant sizing
  - Economic viability vs. diesel
  - Availability vs variability



Summary

- Considerable cost savings by exploiting economies of scale
- Consumers demand more for less
- Power – already a significant impactor on margins
- Carbon tax reduces margins further by around 400 bps
- Awareness, Continuous assessment, and transformational agility - key enablers for energy savings
- Energy sourcing options are equally important

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Thank You

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