



Microgrid for Data Center Infrastructure

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1. GREEN is MONEY

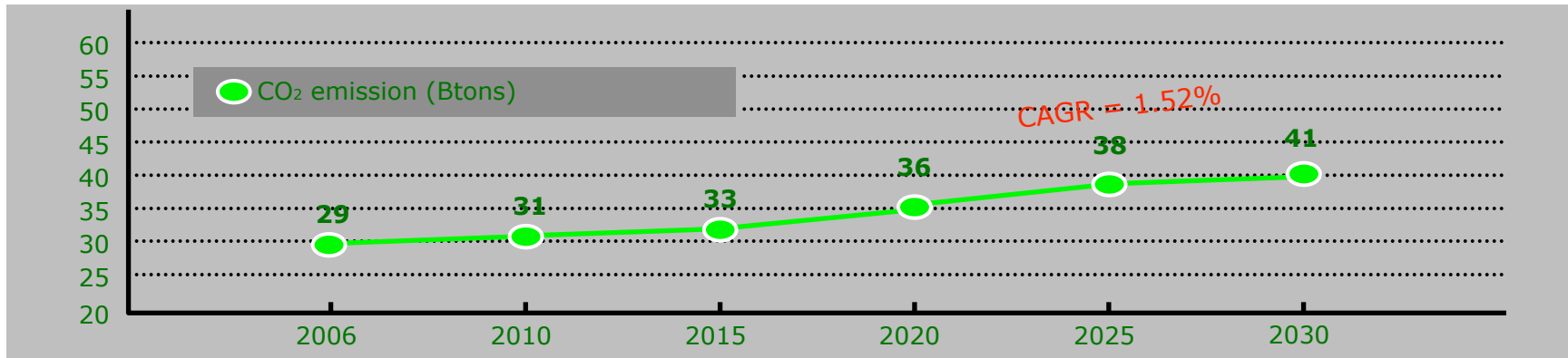
2. Green IDC (Internet Data Center)

3. Microgrid for IDC

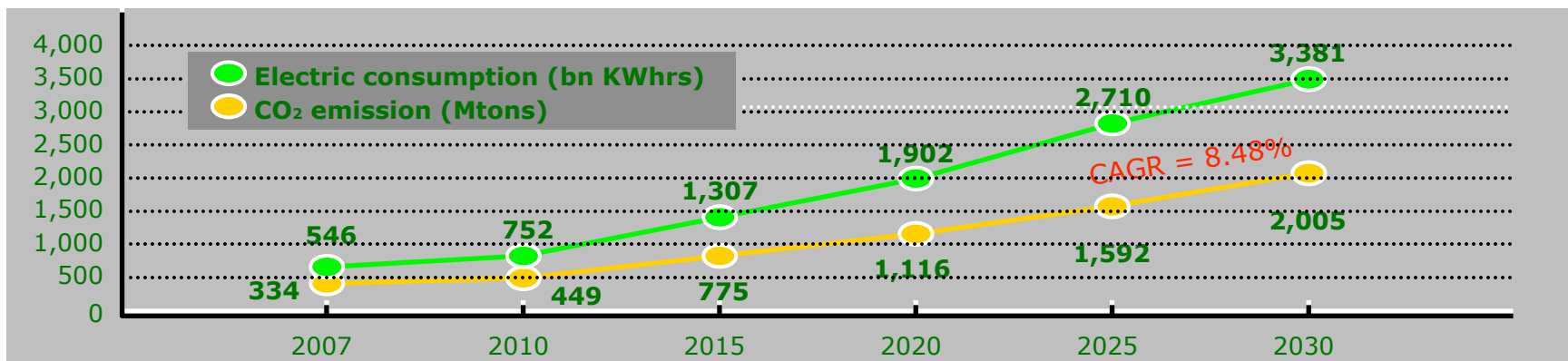


The growth rate of IT sector related CO2 emissions is 5.5 times that of global emissions

Source : Energy Information Administration, World Energy Projections Plus, 2009



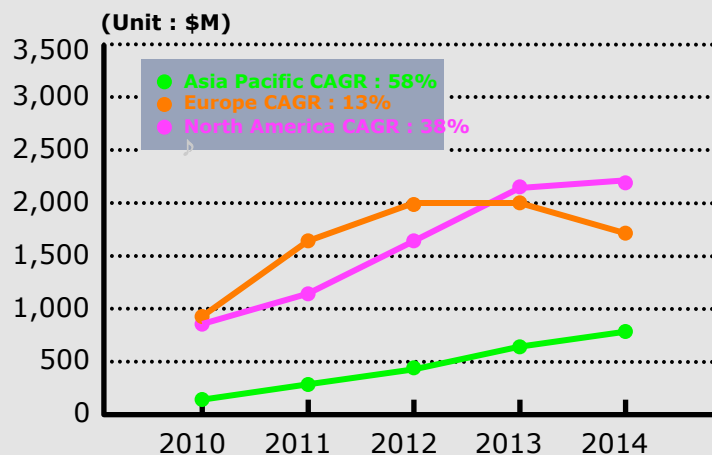
CO₂ emission levels from global energy usage



ICT industry power consumption & CO₂ emission levels

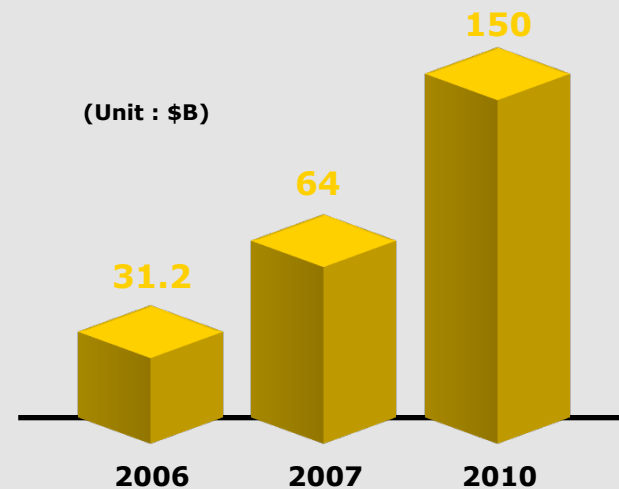
The Green IT Market

The Asian Green IT business is expected to grow 58% on average per annum



Worldwide Green ICT solution market

* Source : Forrester, 2008



Worldwide Carbon Trading Market

* Source : Korean Ministry of Planning and Budget

KT's Green Vision; Green KT, Green KOREA

olleh **kt** strategy for a sustainable green growth

Efficiency
Implementing Green ICT

GREEN KT
GREEN KOREA

New Growth
Providing IT solutions
for green ICT

Social Responsibility
KT will help save the planet
by green ICT

Carbon Emission Reduction

KT will reduce up to 20% of its carbon emissions from 2005 level by 2013

Green Office

LED Lighting

Video Conferencing

Paperless



Green Energy

Solar Panel
power plants

Geothermal
Air-conditioning

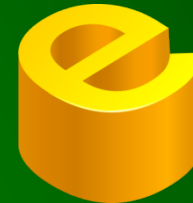


Green Infra

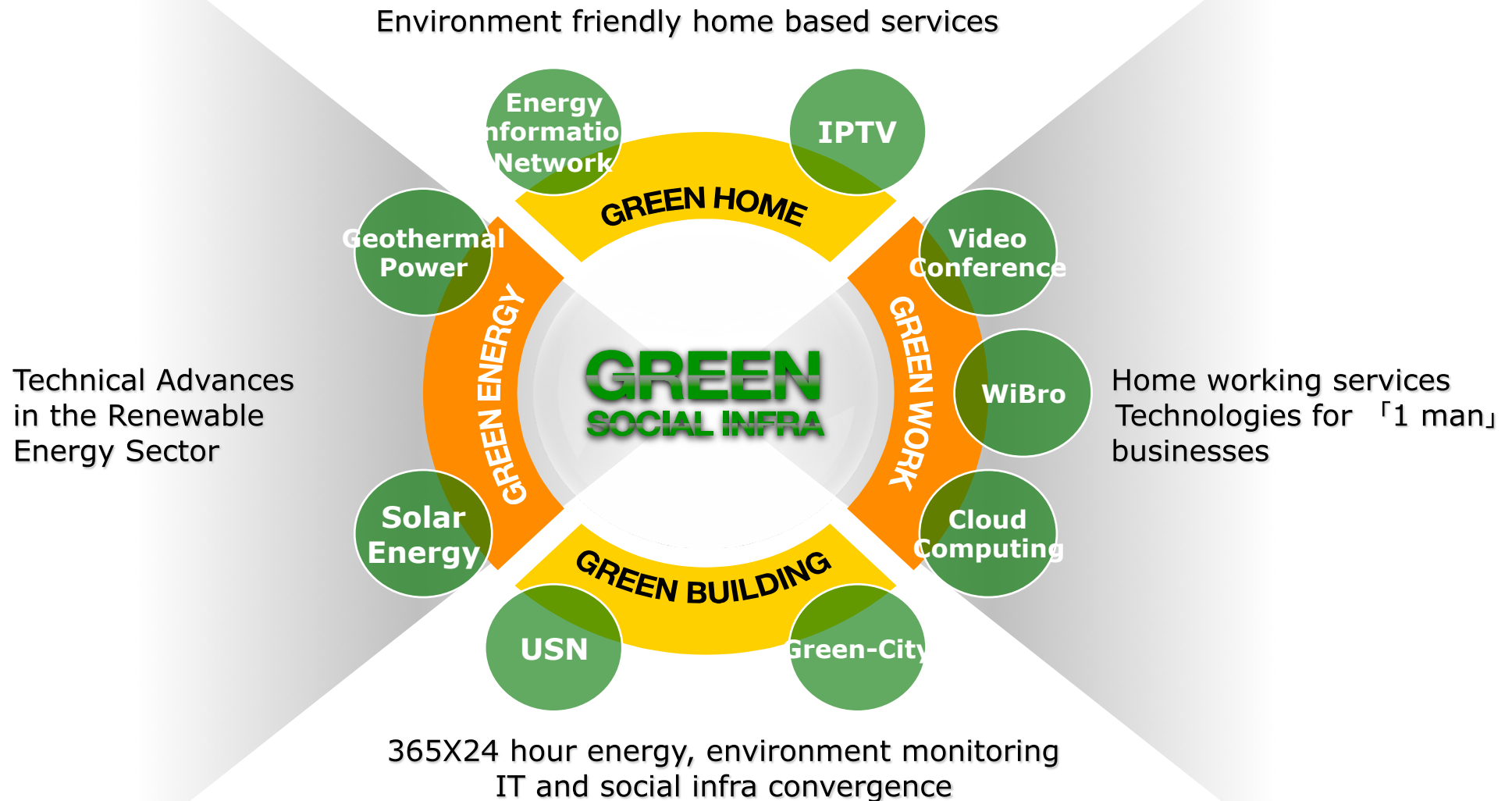
All-IP based BcN

Green IDC

CCC



Green IT business will lead to new growth for KT & Korea



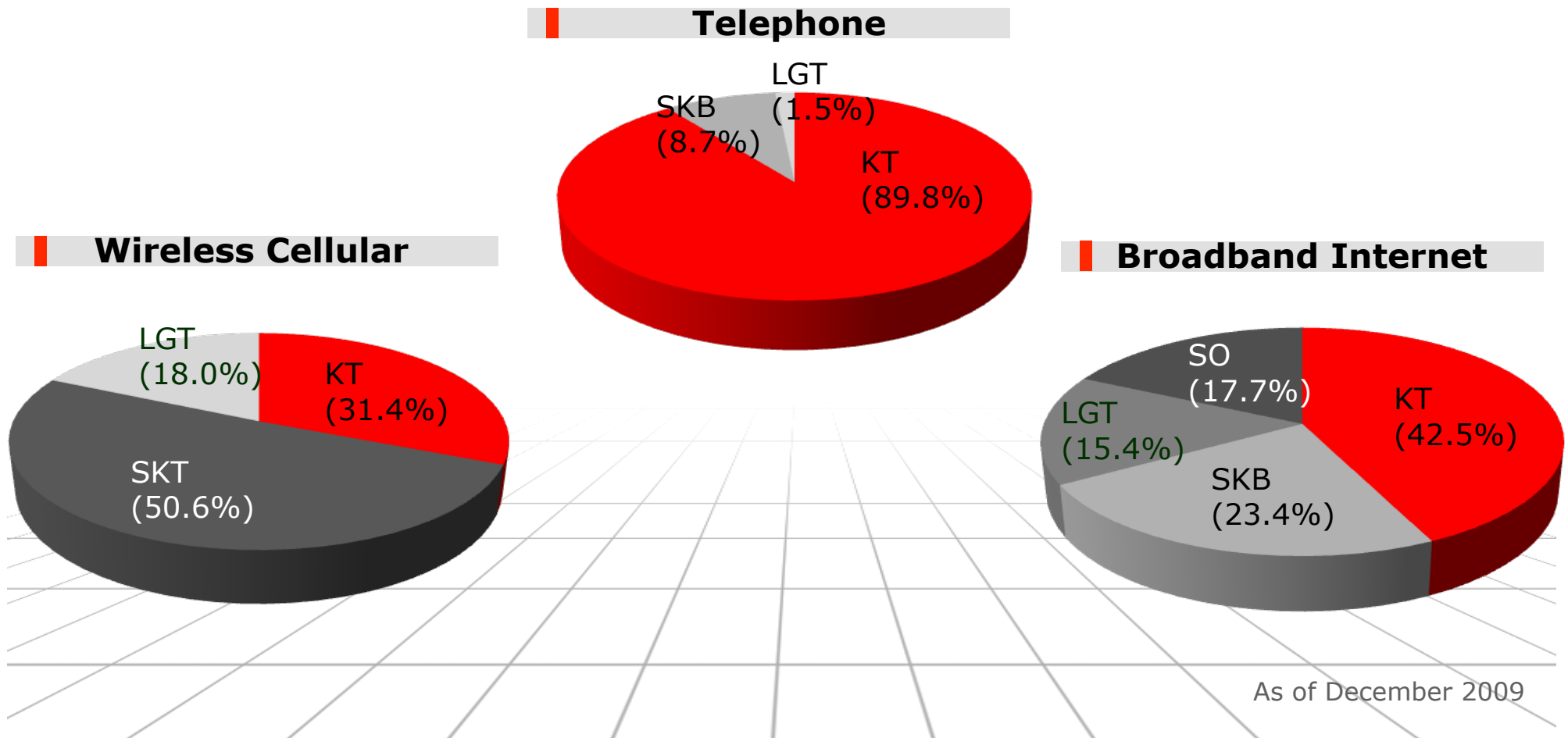
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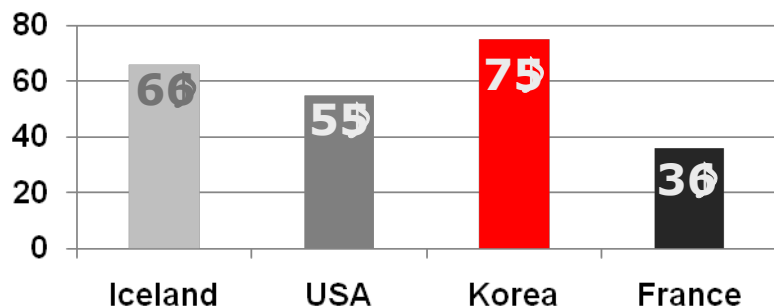


KT takes 1st position in Korea Telecom Market

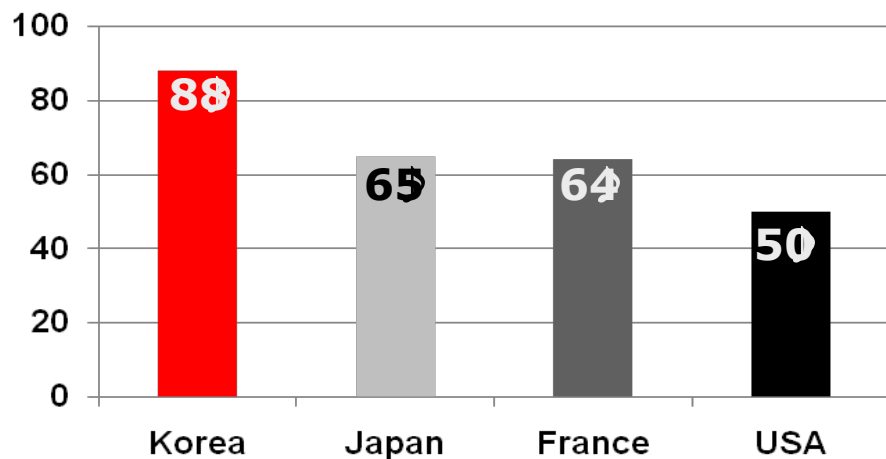


Korea has shown outstanding position in world ICT field

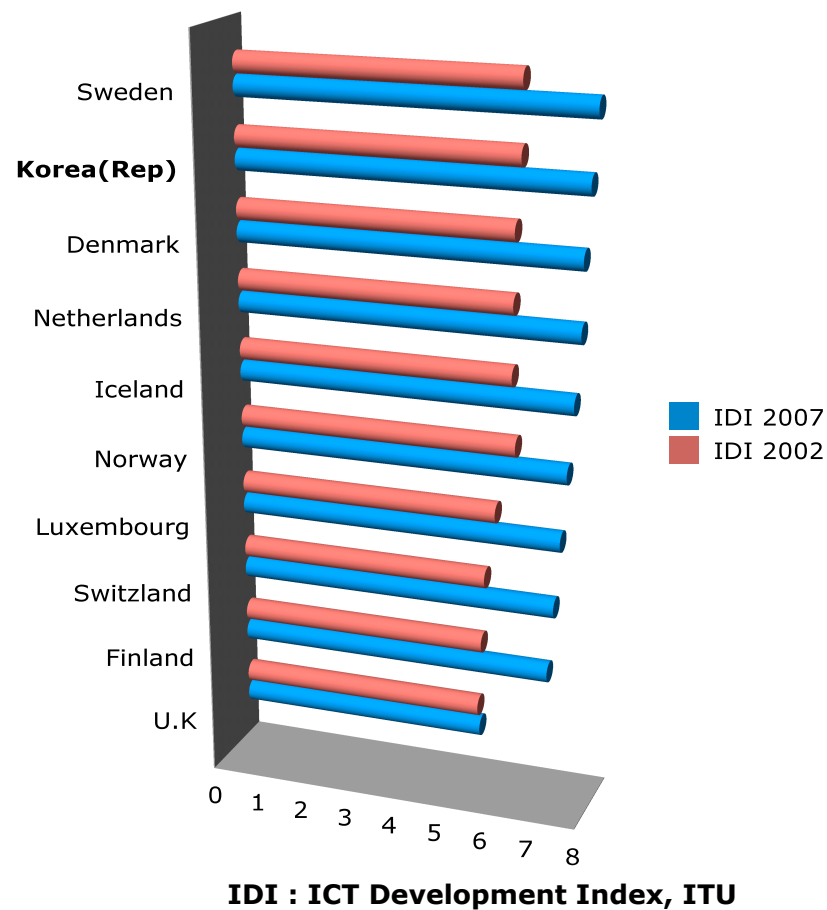
Internet Use(% of total popularity)



Mobile Subscriber Ratio (%)

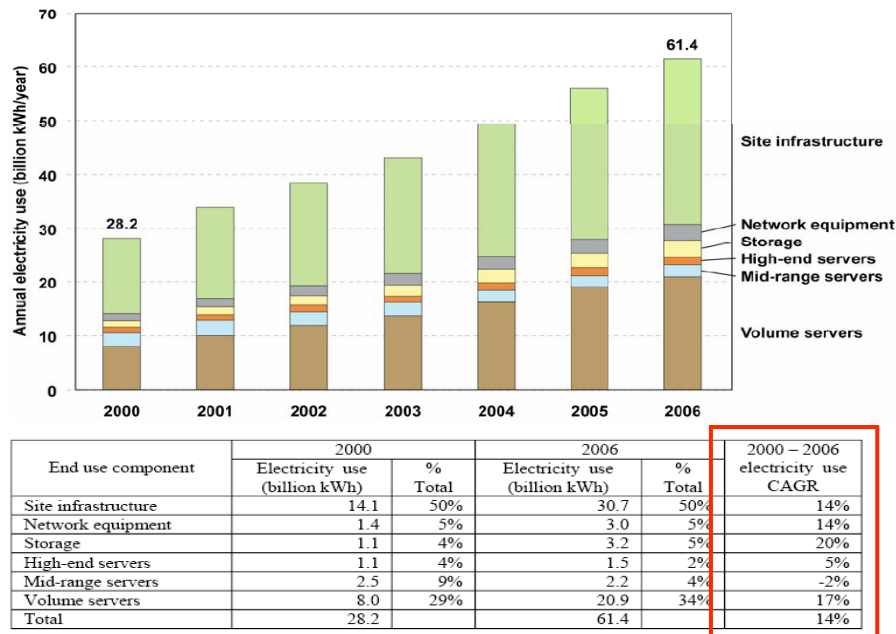


Top 10 IDI Countries

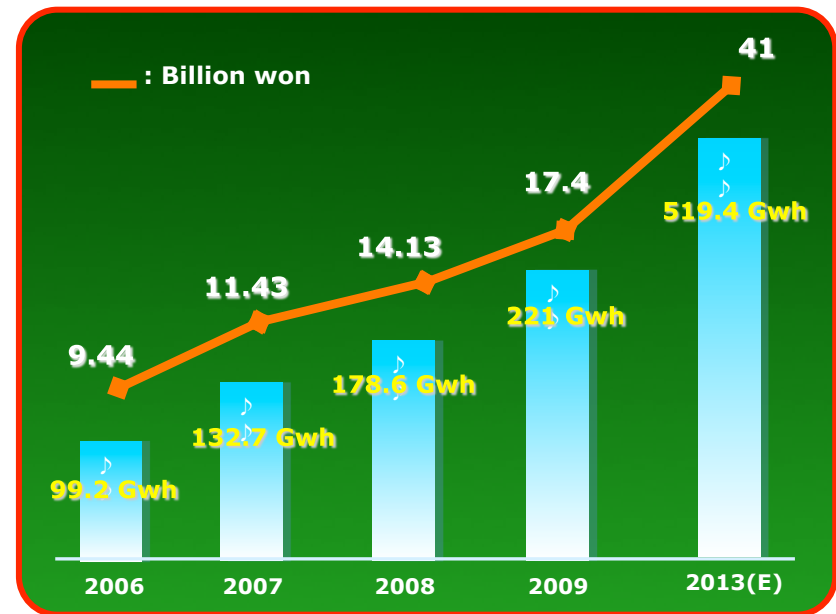


Sources : ITU, IMD, World Competitiveness Yearbook 2007, World Telecommunication Indicator, OECD 2008

Increase in Electrical Consumption of IDCs



Annual Power Consumption in US Data Centers

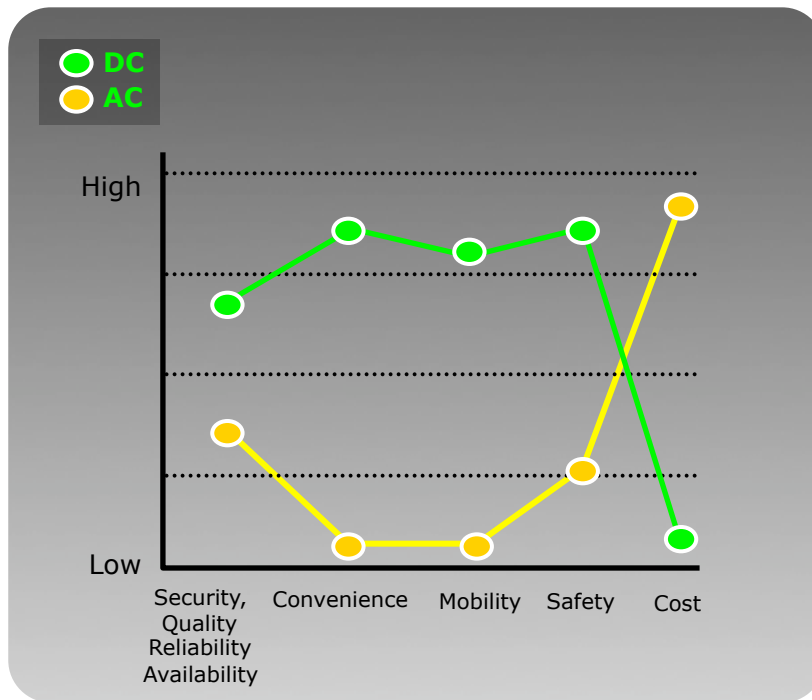


Annual Power Consumption in KT Data Centers

- ▶ KT's main IDC infra(BunDang, MokDong, YoungDong) has experienced an average of 23.8% annual increase in power consumption since the year 2006.
- ▶ If the current trend continues, KT's IDCs will consume 519.4 Gwh of power in the year 2013.

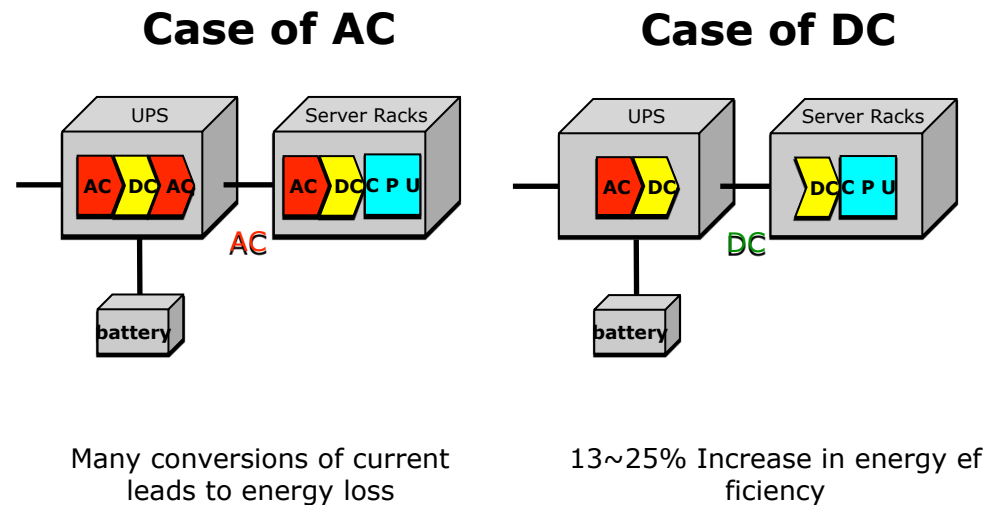
First Step of Green IDC : AC \rightarrow DC

For a full implementation of Green IDC, the power source must be converted from AC to DC to decrease steps in current conversion



<Advantages of DC>

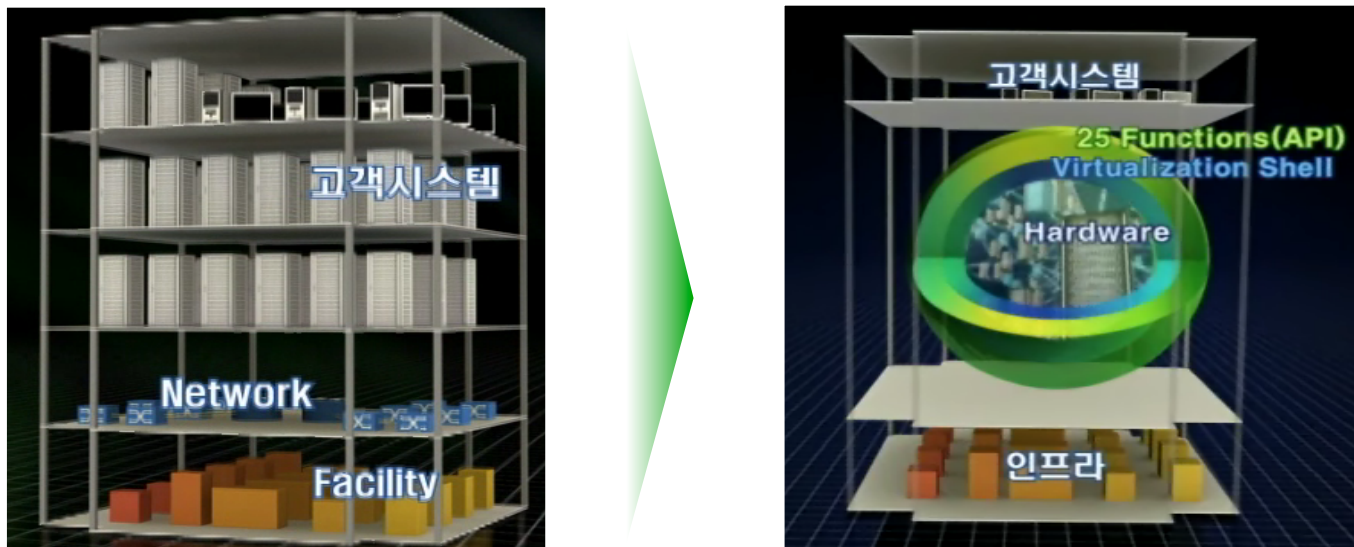
- ▶ **Nam-Suwon IDC** : Partial DC implementation in '06
- ▶ **Bundang, YoungDong, MokDong IDC** : Partial DC implementation in '09



Energy Efficiency of IDC is 16% up !

Second Step of Green IDC : Cloud Computing

KT is converging server, storage and network hardware using virtualization technologies for a radical increase in system efficiency

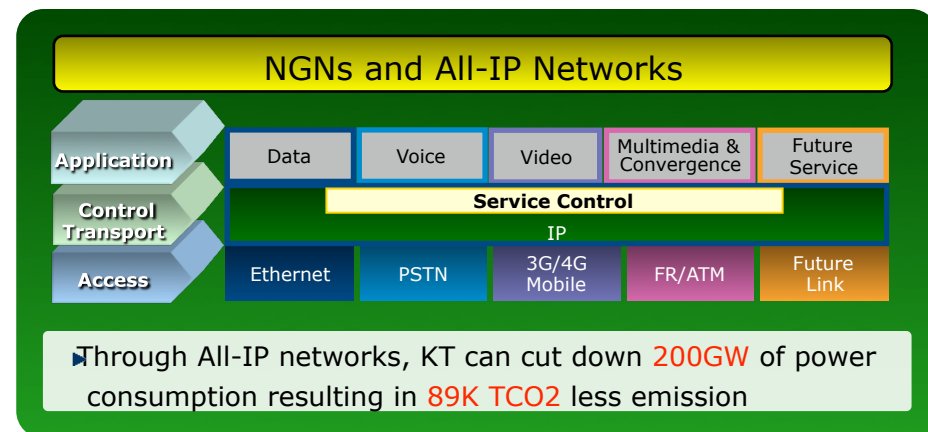
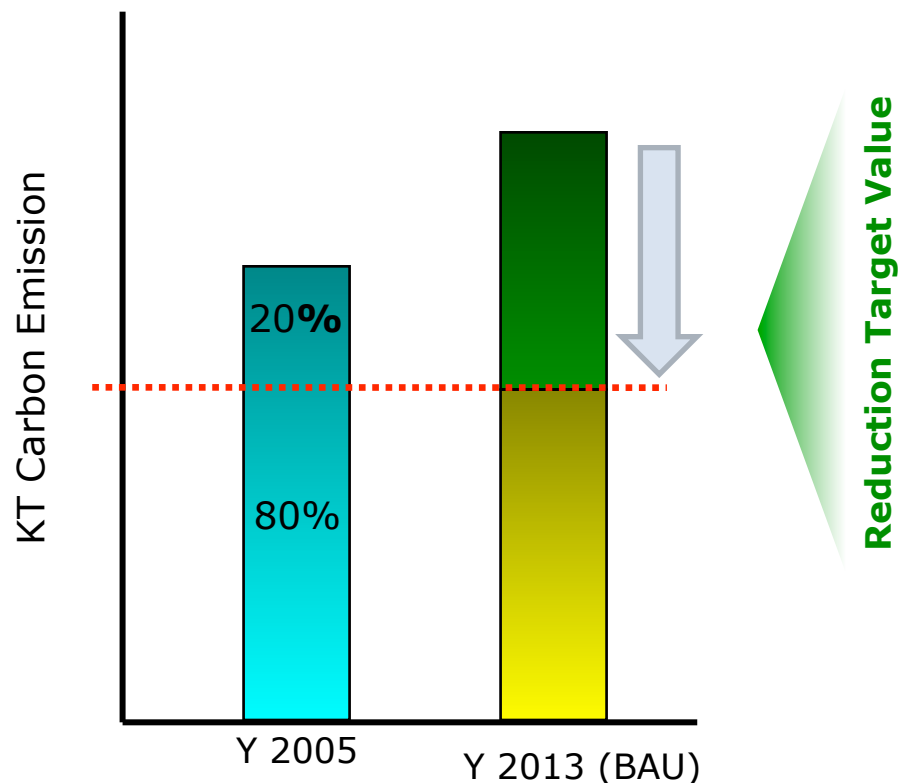


- ▶ Cloud Computing = Virtualization(Cloud) + Utility(Computing)
- ▶ Through cloud computing, KT will
 - 1) improve IT system efficiency,
 - 2) implement personal cloud computing for improved work environments, and
 - 3) apply CC technology into infra/platform based hosting services

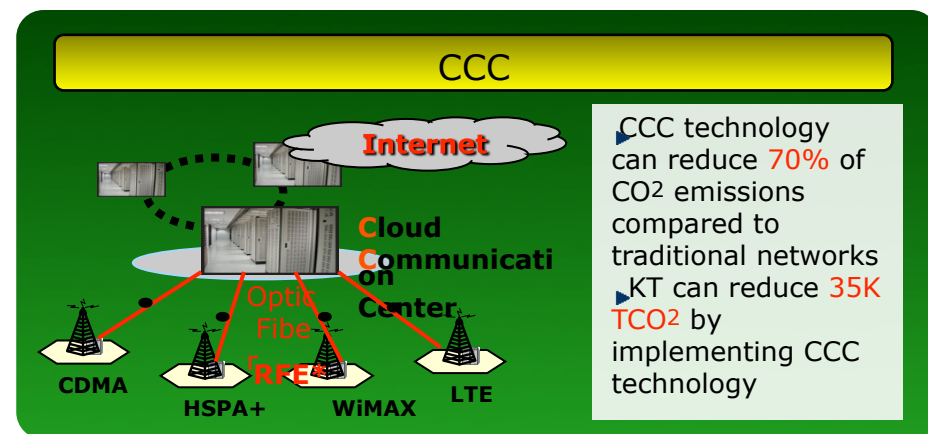
Energy Efficiency of IDC is 22% up !

Two steps covers 10% of target value of Carbon Emission Reduction

Adding on Integrated single network, video-conferencing, Cloud Communications Center, etc.



NGN(All-IP)	29%
Video-conf.	17%
CCC	12%
Green IDC	10%
Others	32%



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KT ELITE (Electric Power Centralized Management System)

The Elite is a EMS implemented inside KT's intranet to remotely monitor and manage in real-time the power consumption and generation (i.e., diesel turbine generator) of over 4,000 KT owned infrastructures

Automated observation of power supply for stable operations in KT telecommunication facilities

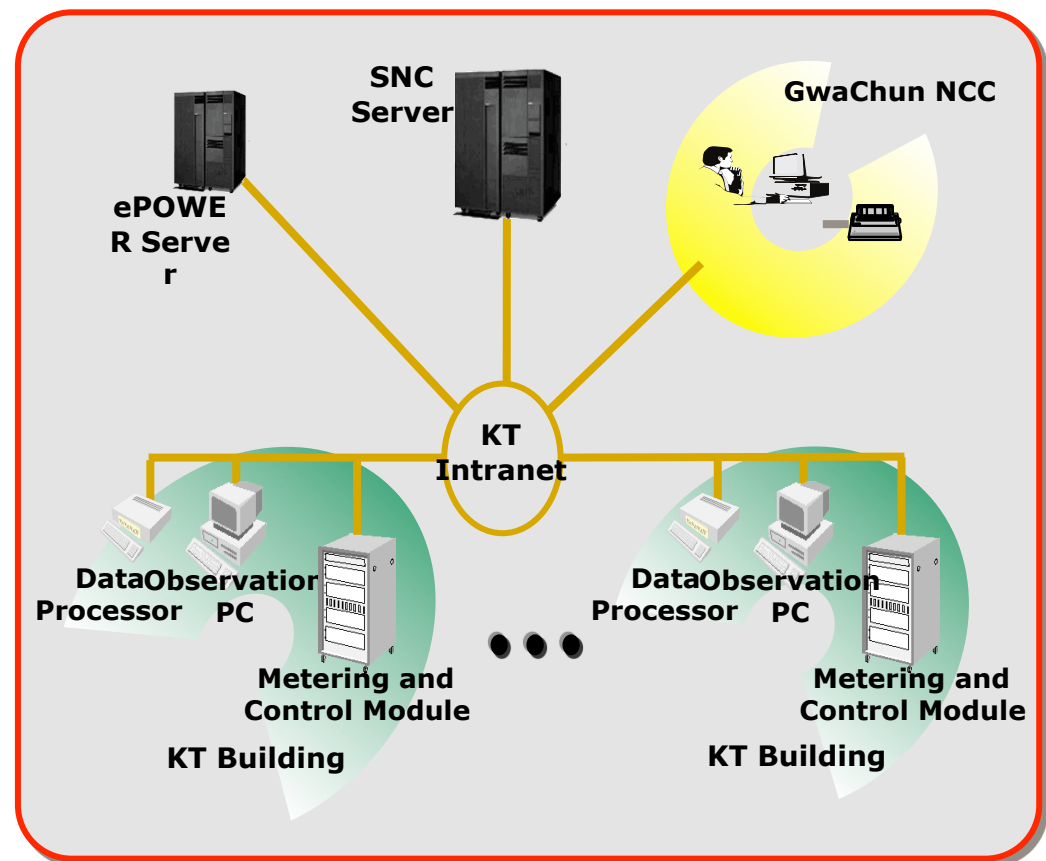
A unified power bill covering over 4,000 KT infrastructures and peak control for lower energy budget

An automated switch to backup generators incase of prolonged power blackout

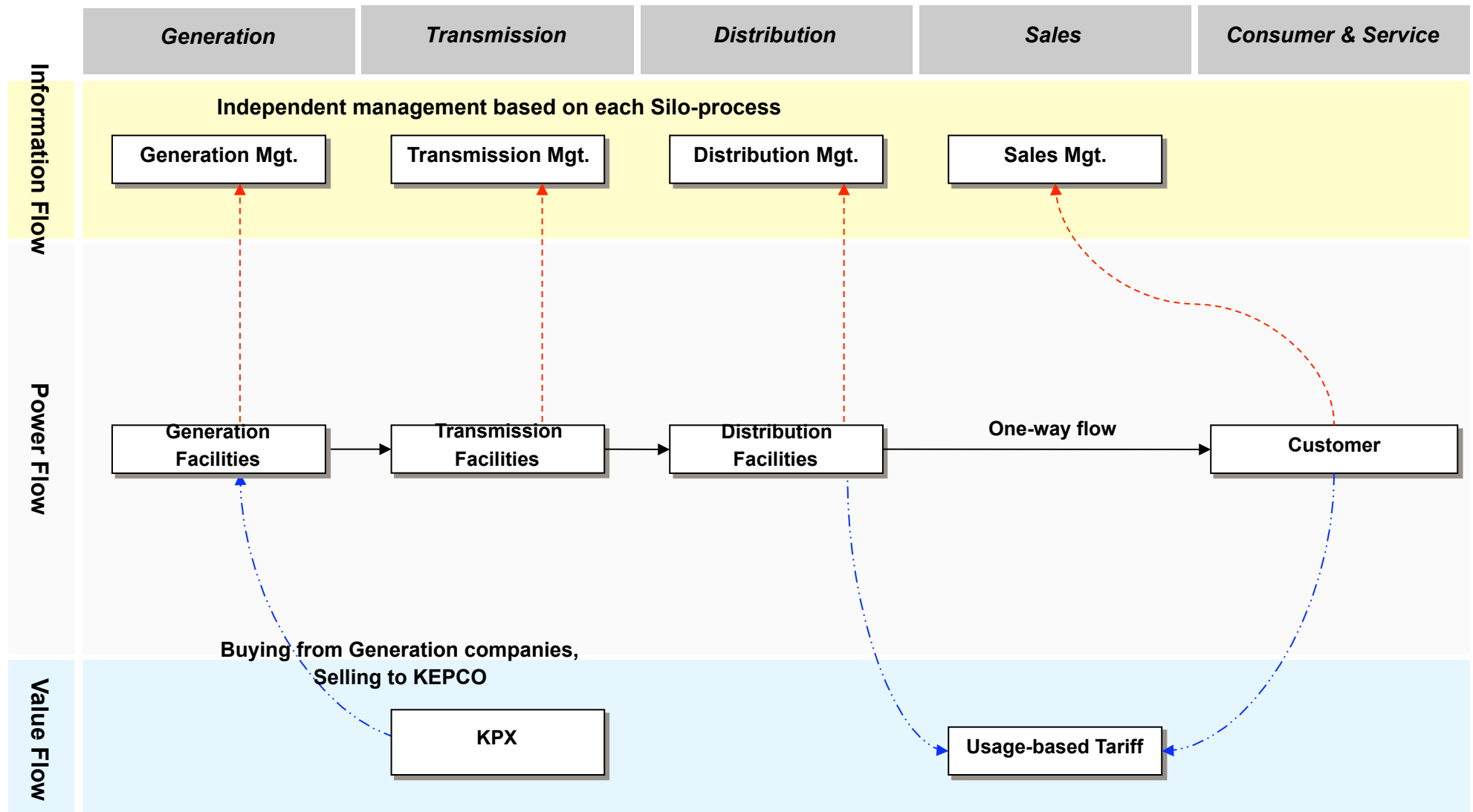
Faster recovery time of power equipment failures

Remote implementation of emergency procedures incase of natural disasters such as fire and floods

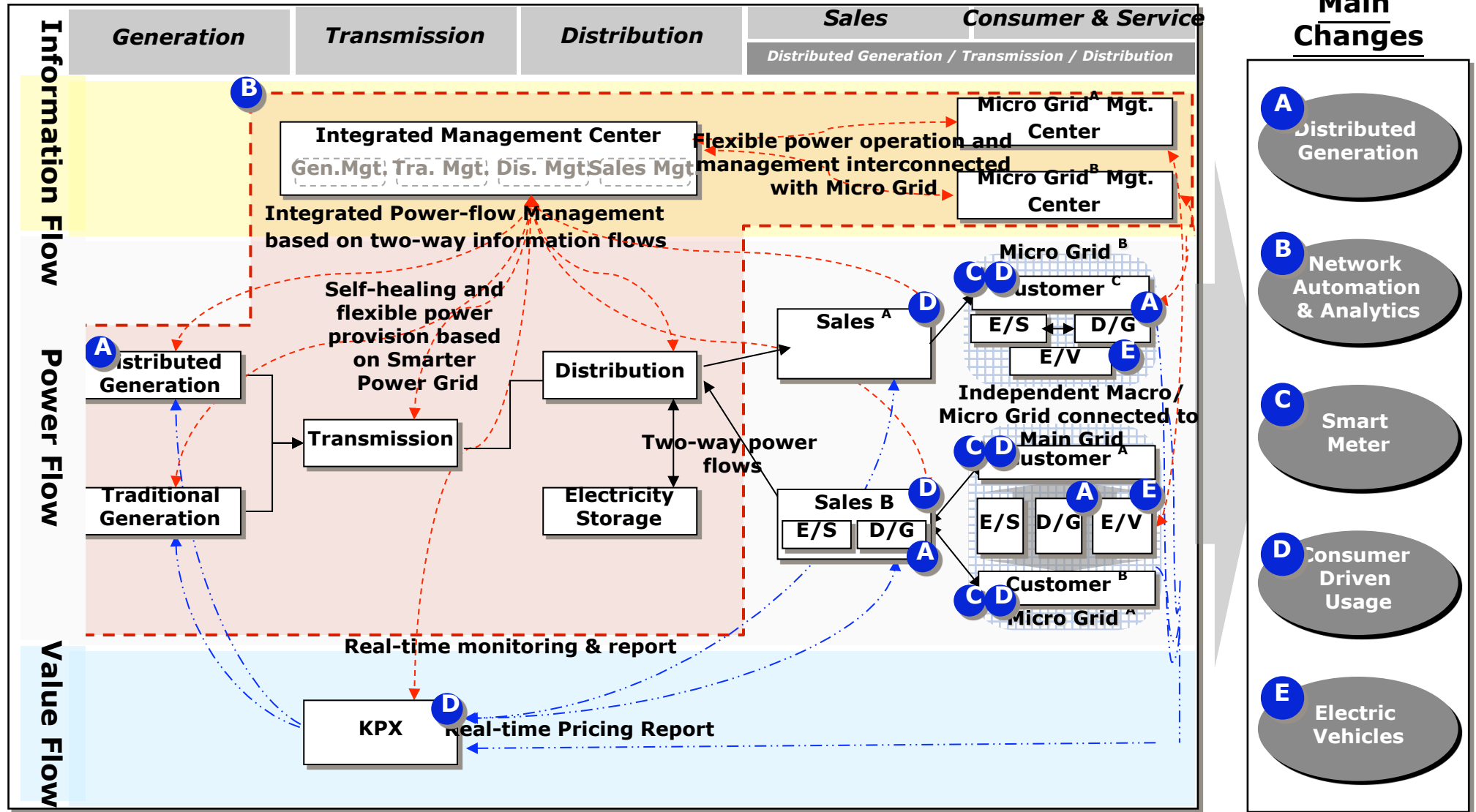
Power management and peak controls for unmanned infrastructures



Power Grid – AS IS : Korea

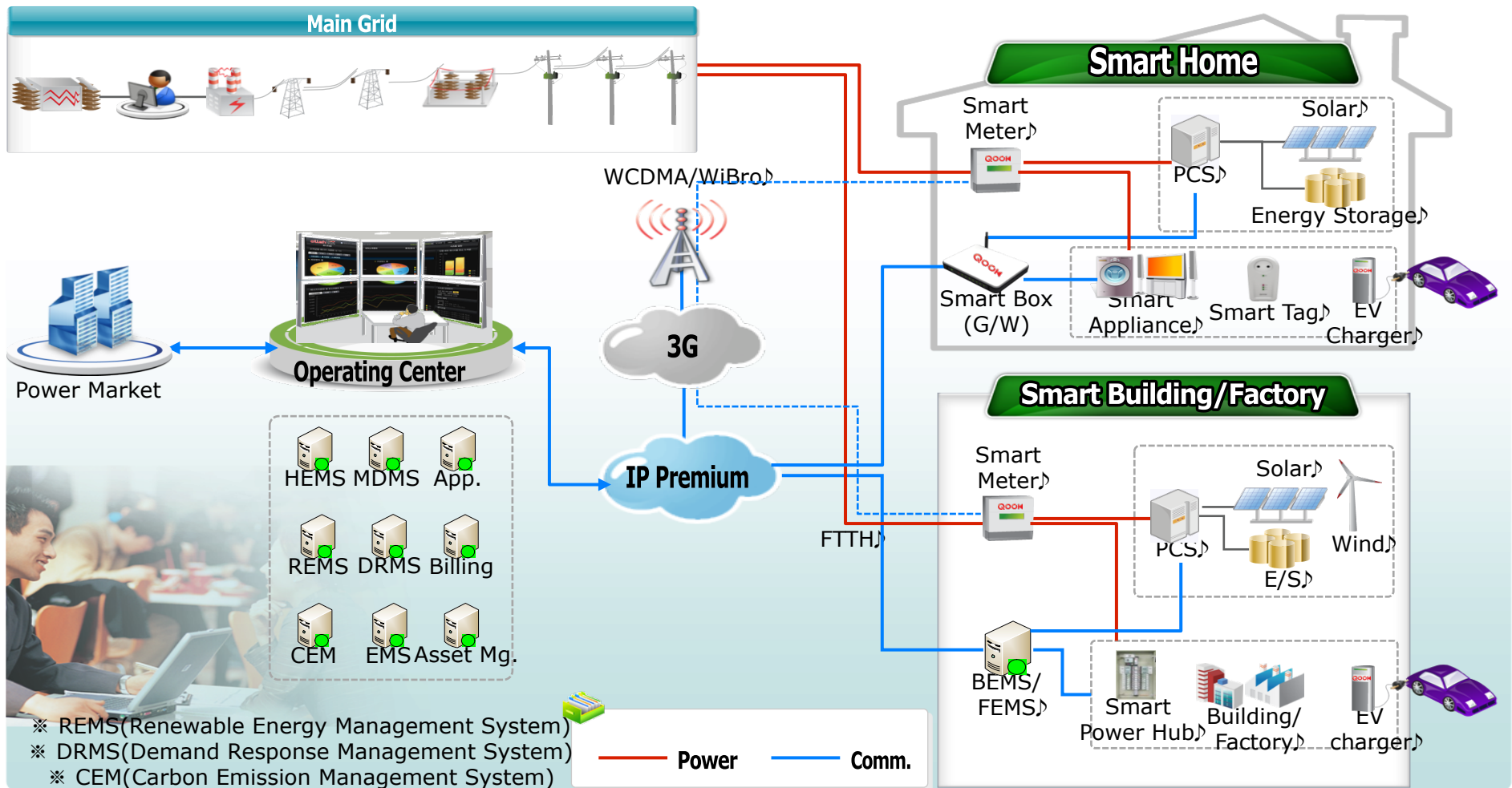


Smart Grid – TO BE : Future, ideally



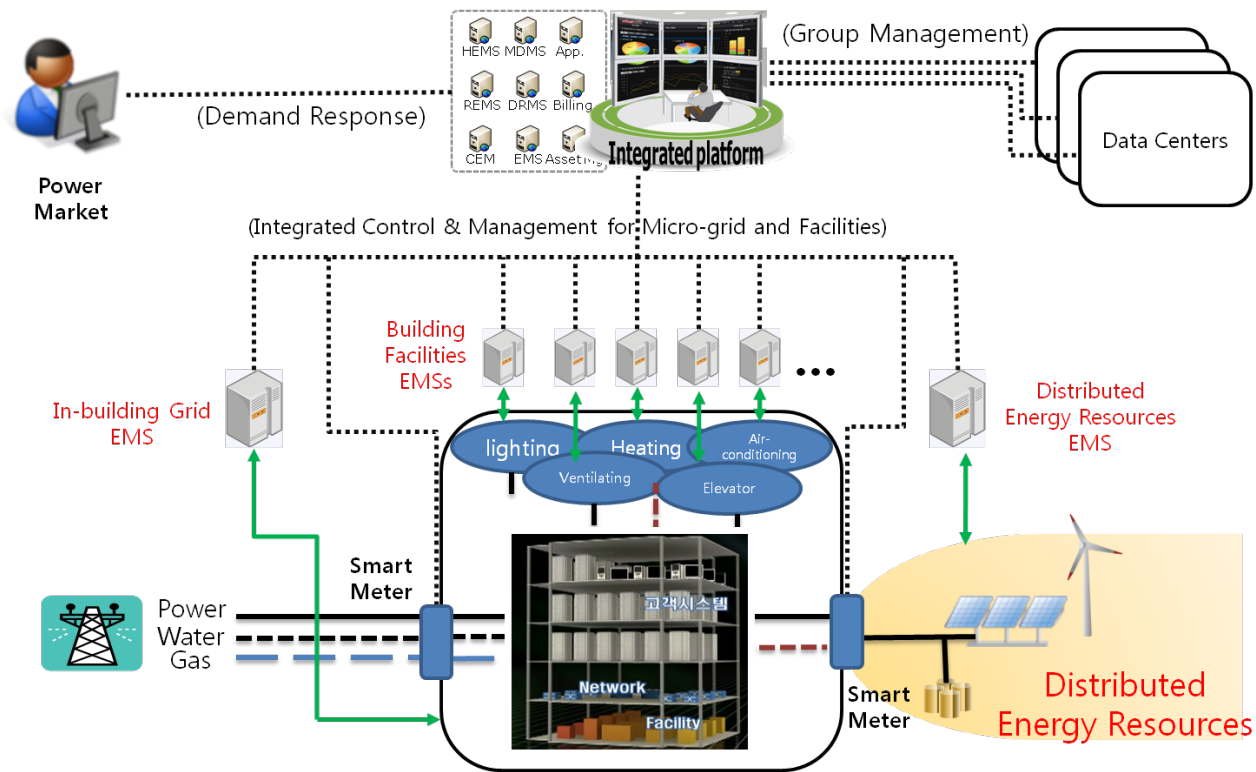
Jeju Field Trial for Smart Grid

Smart Grid can be achieved by the convergence between Power and ICT sector. Smart Building will be the most attractive market on this era.



Third Step of Green IDC : Microgrid-based

Distributed generation of renewable energy, energy storage, demand response, fuel cell, Energy Management System, etc. should be implemented as well.



- ▶ Based on Integrated Management Platform,
 - 1) improve energy efficiency,
 - 2) implement distributed energy resources (fuel cell, PV, E/S), and
 - 3) interact with energy market through demand response, FMS, BEMS.

Summary

GREENING is the most important aspect of Corporate Strategy in this era.

The approach is not only Reducing energy consumption,
but also Distributed generation, storing and integrated management of energy.

KT implemented Microgrid technology into IDC first, for internal purpose.

It will also give us Business opportunity on Smart Grid environment.

THANK YOU
FOR YOUR ATTENTION!