

# Green Telecom and the Applications of IoT – Experiences from CHT



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一直走在最前面

**Dr. Yuan-Kuang Tu**

**President**

**Telecom Laboratories**

**Chunghwa Telecom Co., Ltd.**

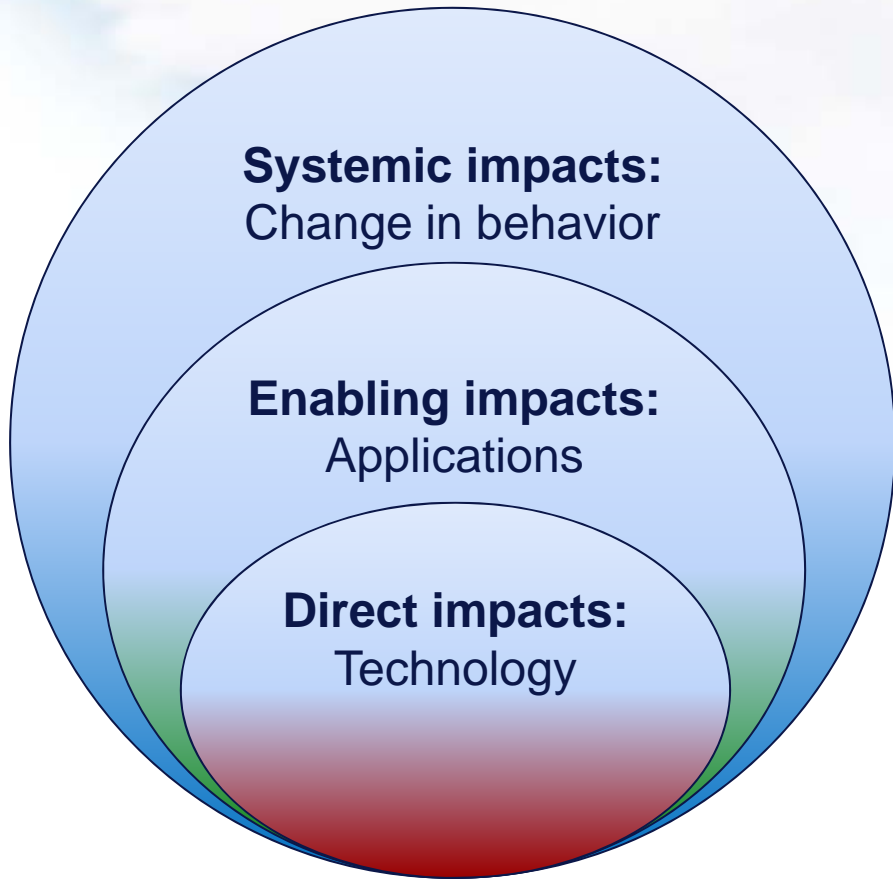
April. 8, 2011

presentation to Green Touch Open Forum



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# Framework for Green ICT



Ref: Greener and Smarter: ICTs, the Environment and Climate Change, Sept. 2010, OECD

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# Core Business of CHT

## 2010 Revenue Breakdown (Consolidated)

### ■ Broadband Access

- ADSL
- WLAN
- FTTx

### ■ Internet Services

- HiNet

### ■ Business Intranet

- X.25 \ ATM \ FR
- IPVPN

### ■ Leased Line

#### VAS:

- IPTV (MOD)
- Xuite
- hiGame
- hiChannel
- hiStock
- hiB2B
- hiAD
- hiMusic

### ■ Handsets sale

### ■ Billing handling

### ■ 2G GSM

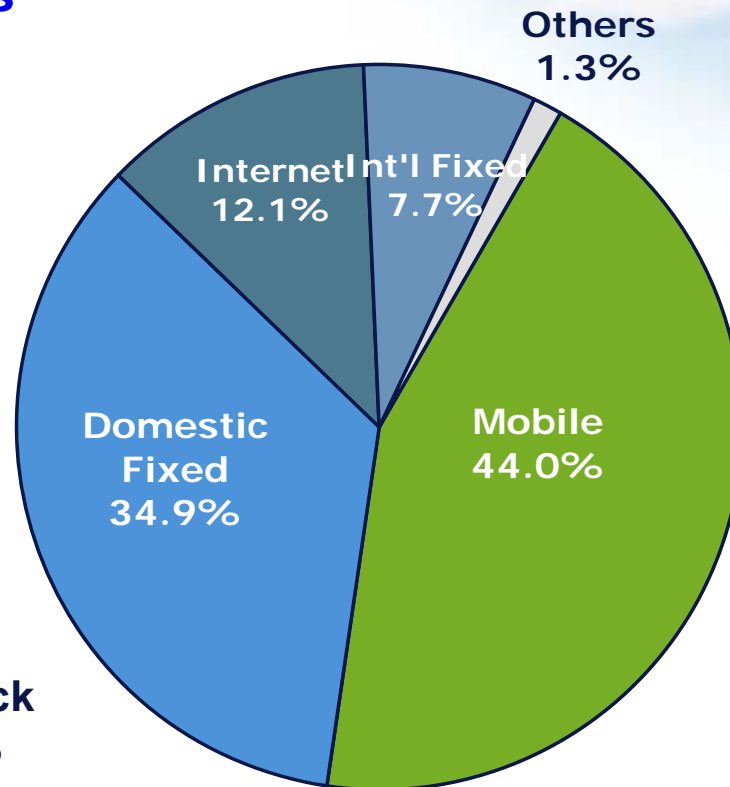
### ■ 2.5G GPRS

### ■ 3G WCDMA

### ■ 3.5G HSDPA

#### VAS:

- SMS
- MMS
- JAVA Game
- Ring Back Tone
- Mobile internet
- Mobile TV



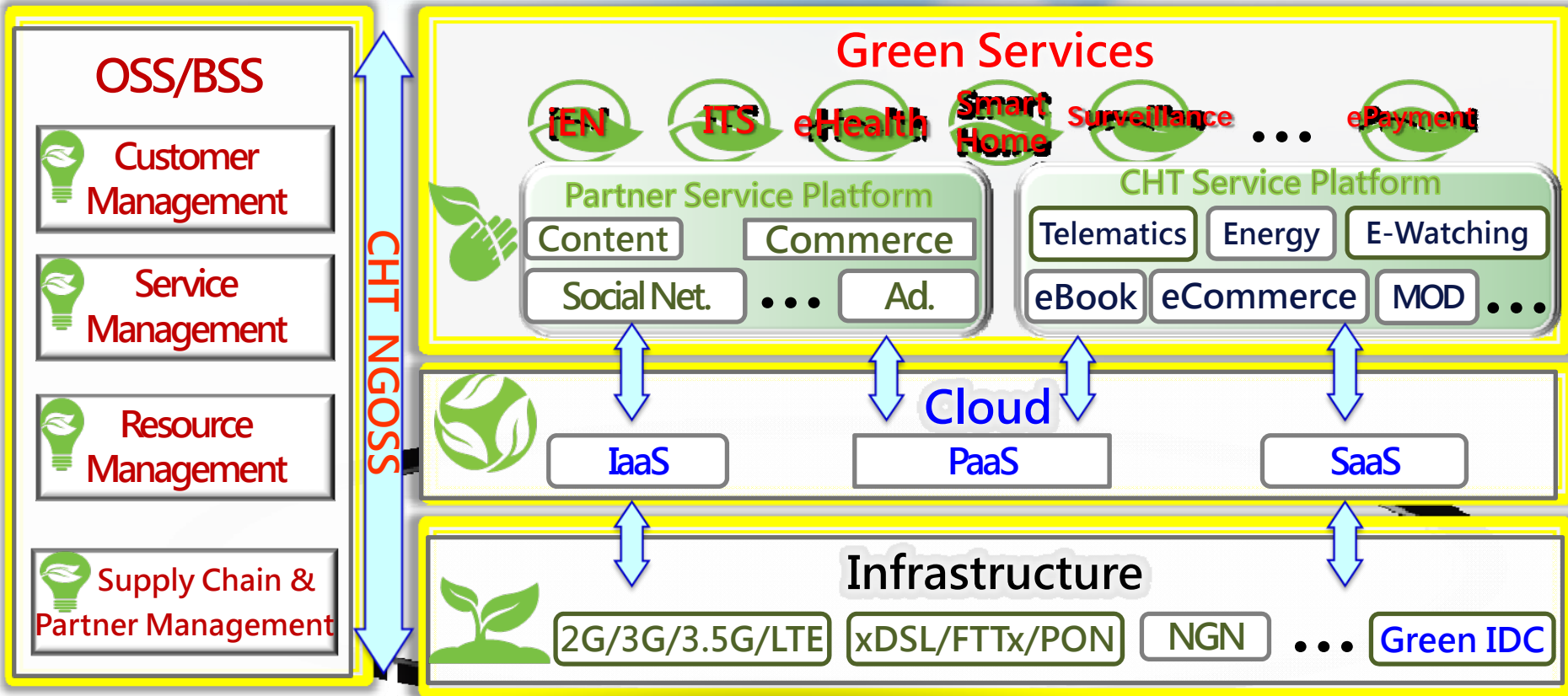
Note: The figure of 2010 was un-audited.

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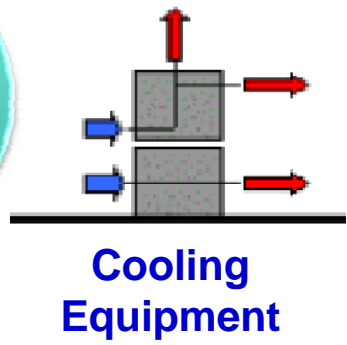
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# Toward a Green Telco





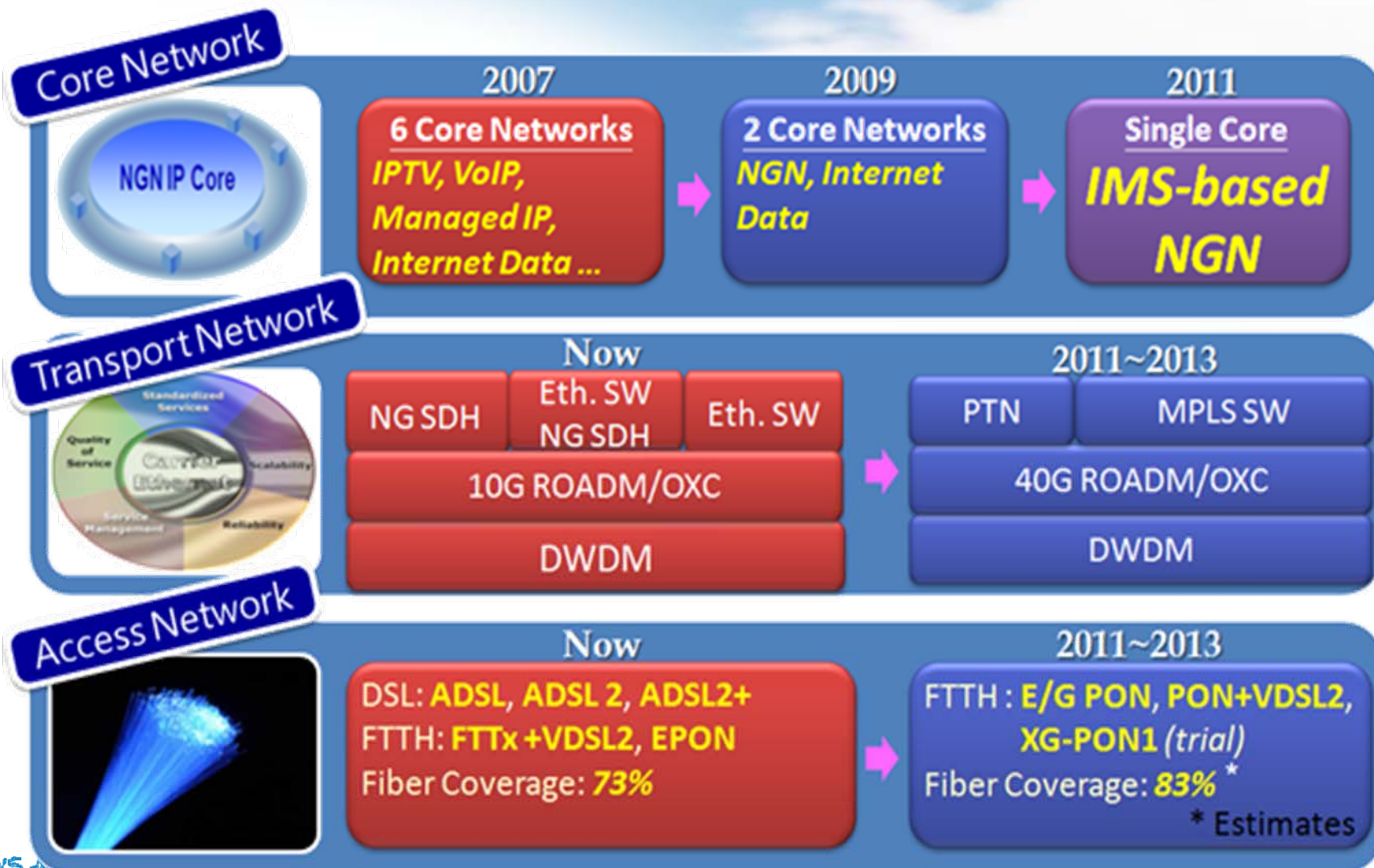
# Green Equipment (Green of ICT)



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# Green in Fixed-line Networks



ALWAYS



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# Green Strategy in Core Networks

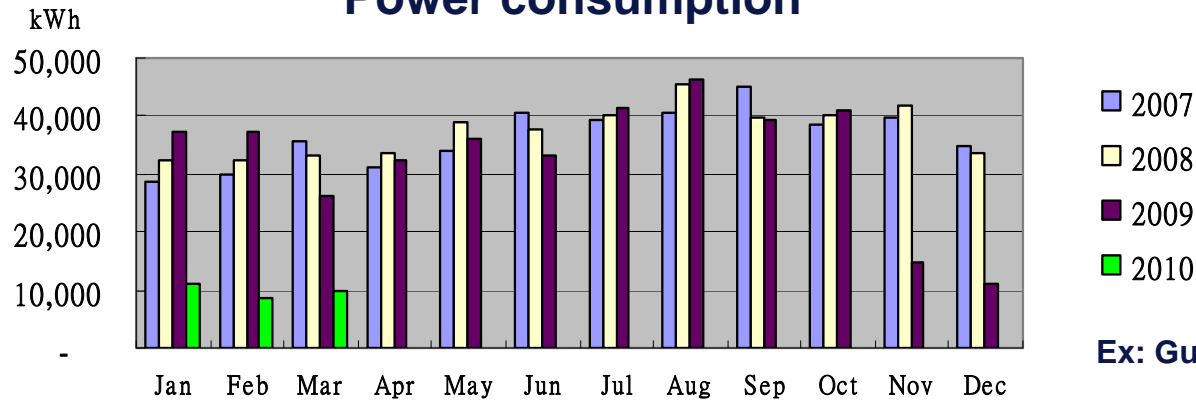
**PSTN LS**



**NGN AG**



**Power consumption**



Ex: Guandu Central Office

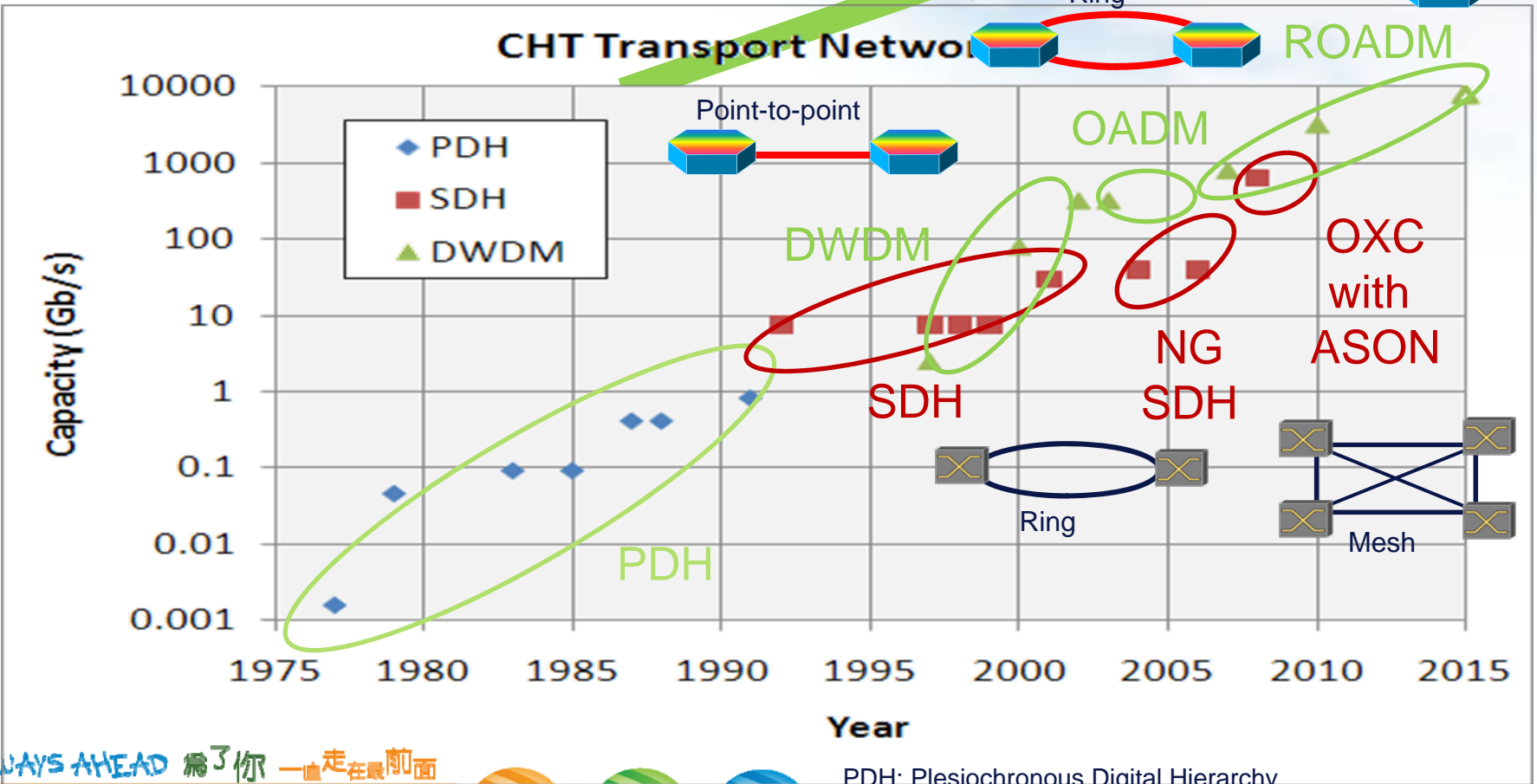
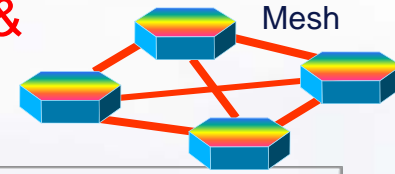
## Benefits

- 75 % less floor space required
- 82 % power saving (racks, air conditioning...)
- Fewer core elements

# Green Strategy in Transport Networks

Complexity & Flexibility

Enable Intelligence & Automation

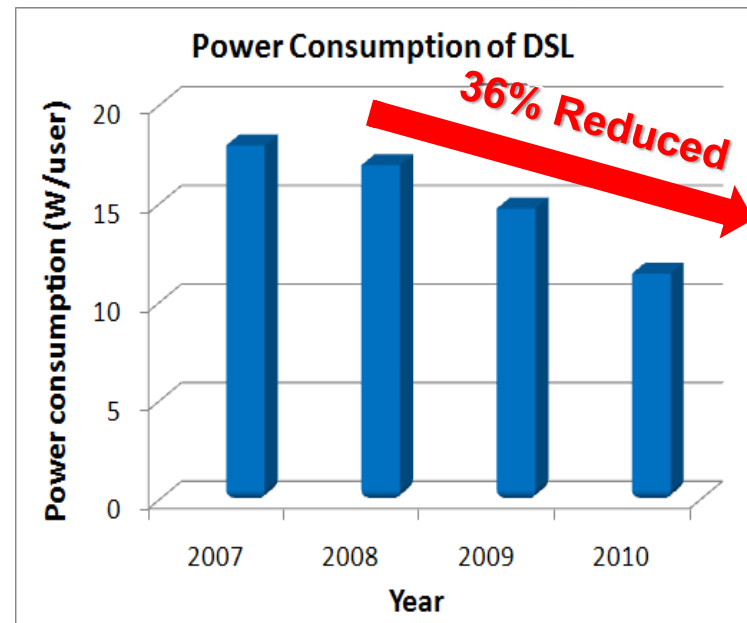
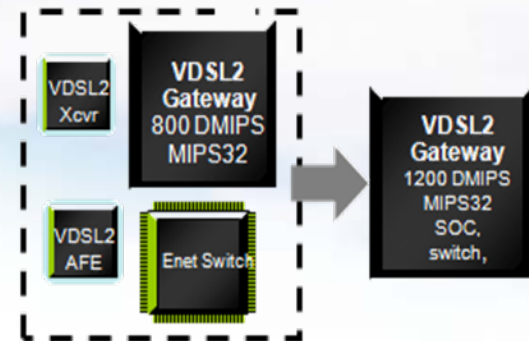
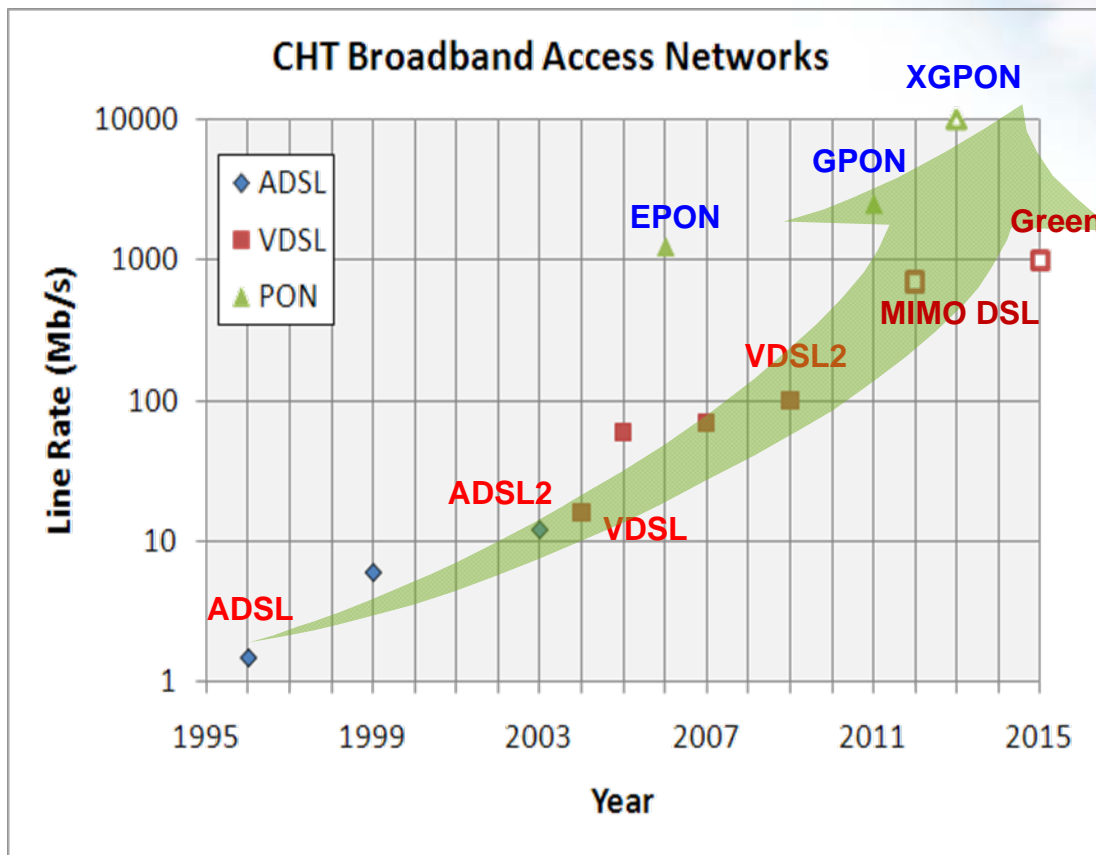


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PDH: Plesiochronous Digital Hierarchy  
 NG SDH: Next-Generation Synchronous Digital Hierarchy,  
 ASON: Automatically Switched Optical Network  
 OXC: Optical Cross Connection



# Green Strategy in Access Networks



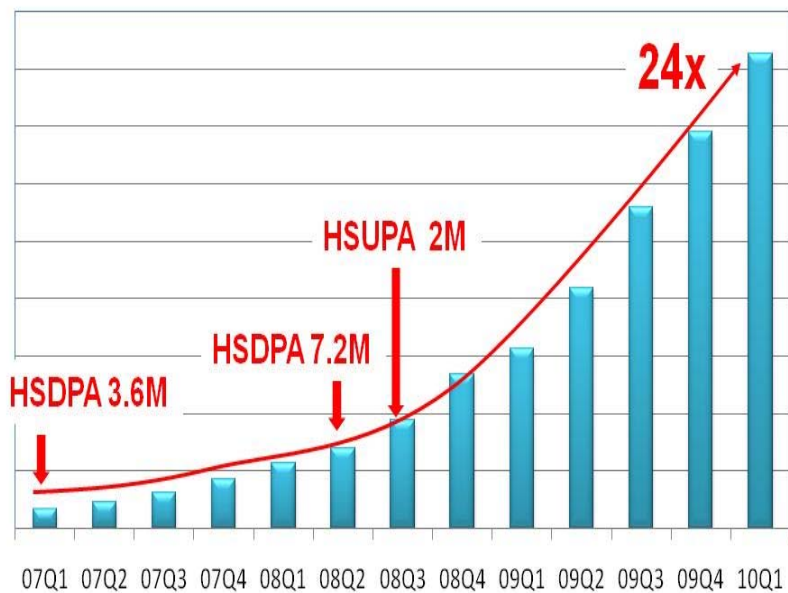
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# Green in Mobile Networks

## CHT Mobile Data Traffic



24 times growth in the past 3 years



Renewable Energy



Free Cooling

Energy Saving

Equipment Upgrade

Co-Location



BS Power: 2.56 KW



BS Power: 790W



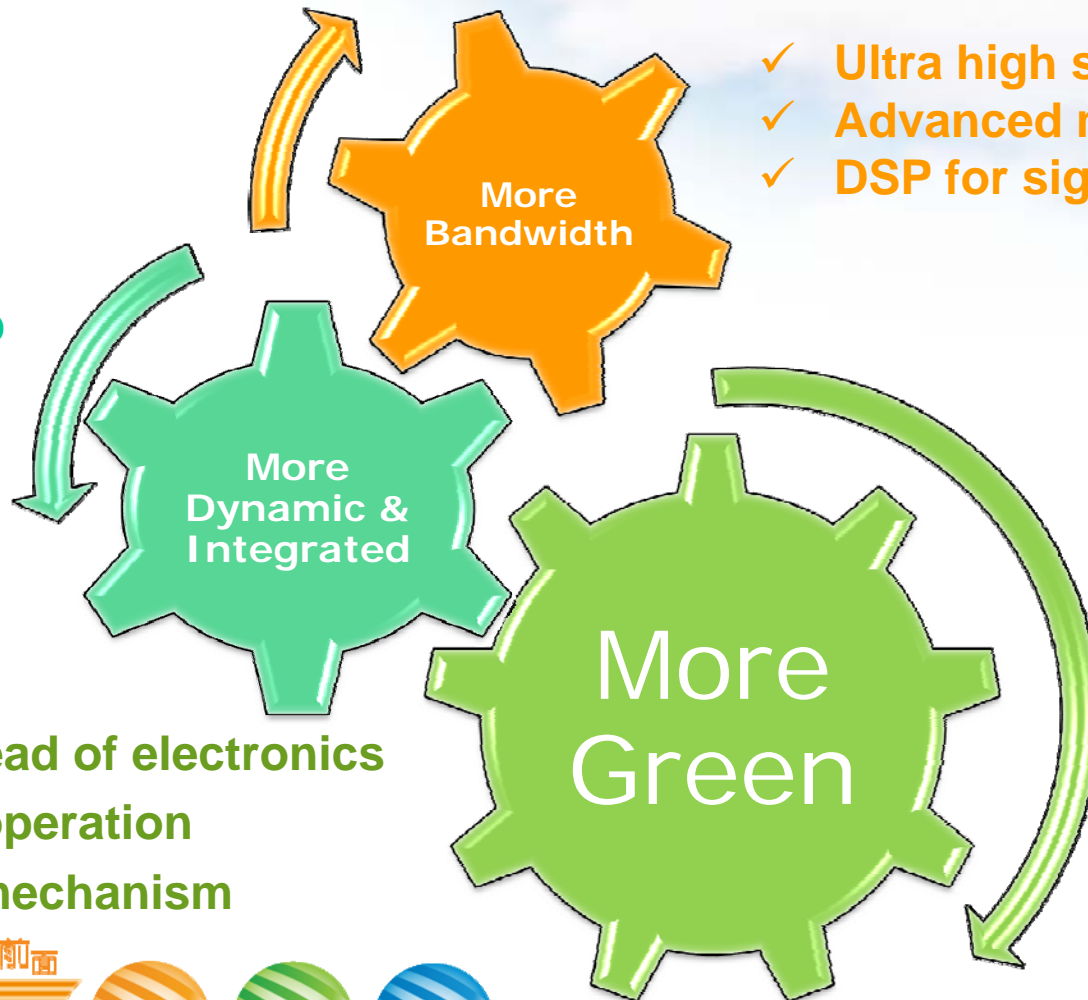
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# Evolution Trends in Network Infrastructure

- ✓ Intelligent management & control system
- ✓ System-on-chip



- ✓ Ultra high speed
- ✓ Advanced modulation
- ✓ DSP for signal detection

- ✓ Photonics instead of electronics
- ✓ Energy-aware operation
- ✓ Power saving mechanism

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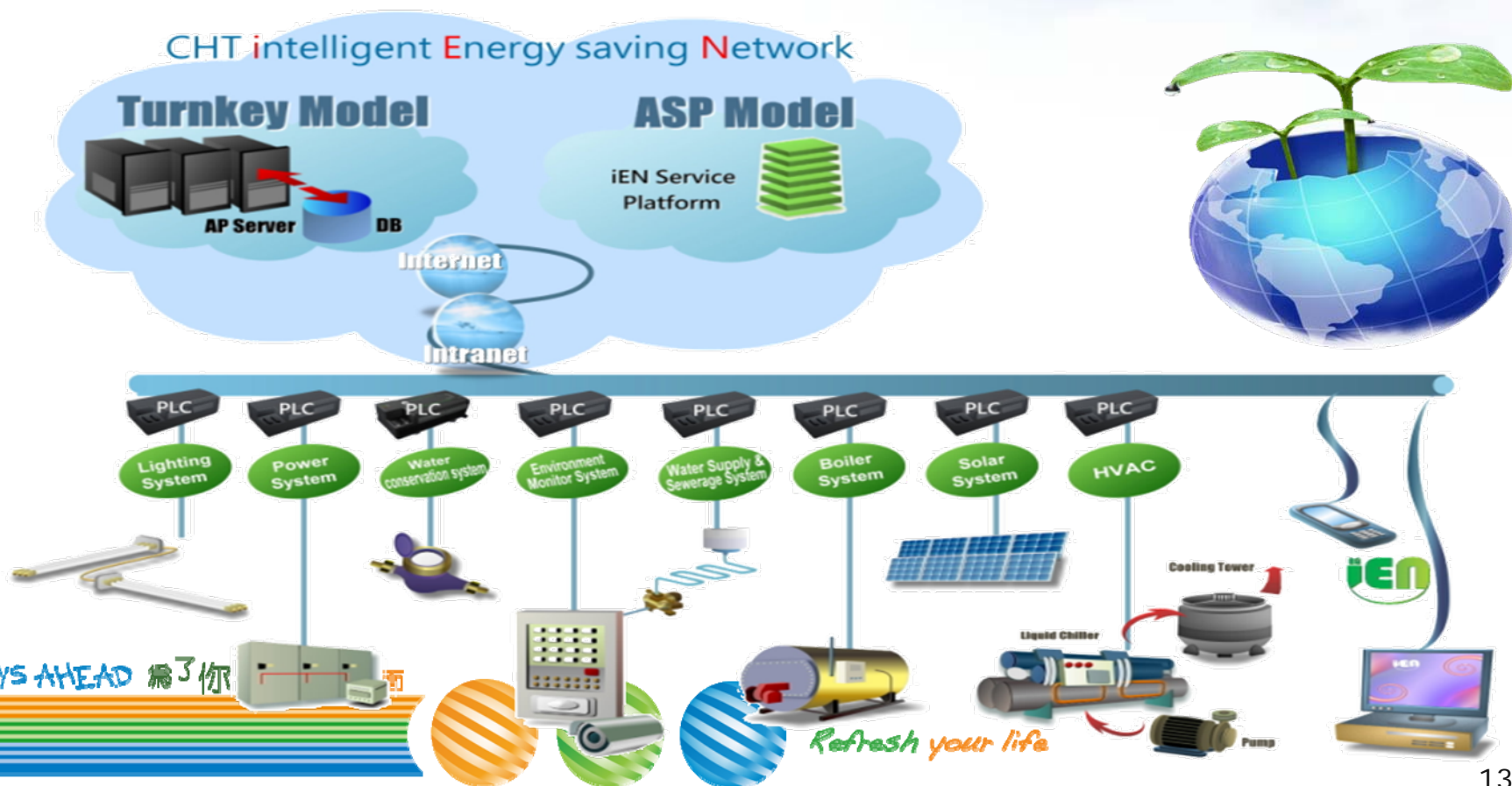
# Green Service (Green by ICT)



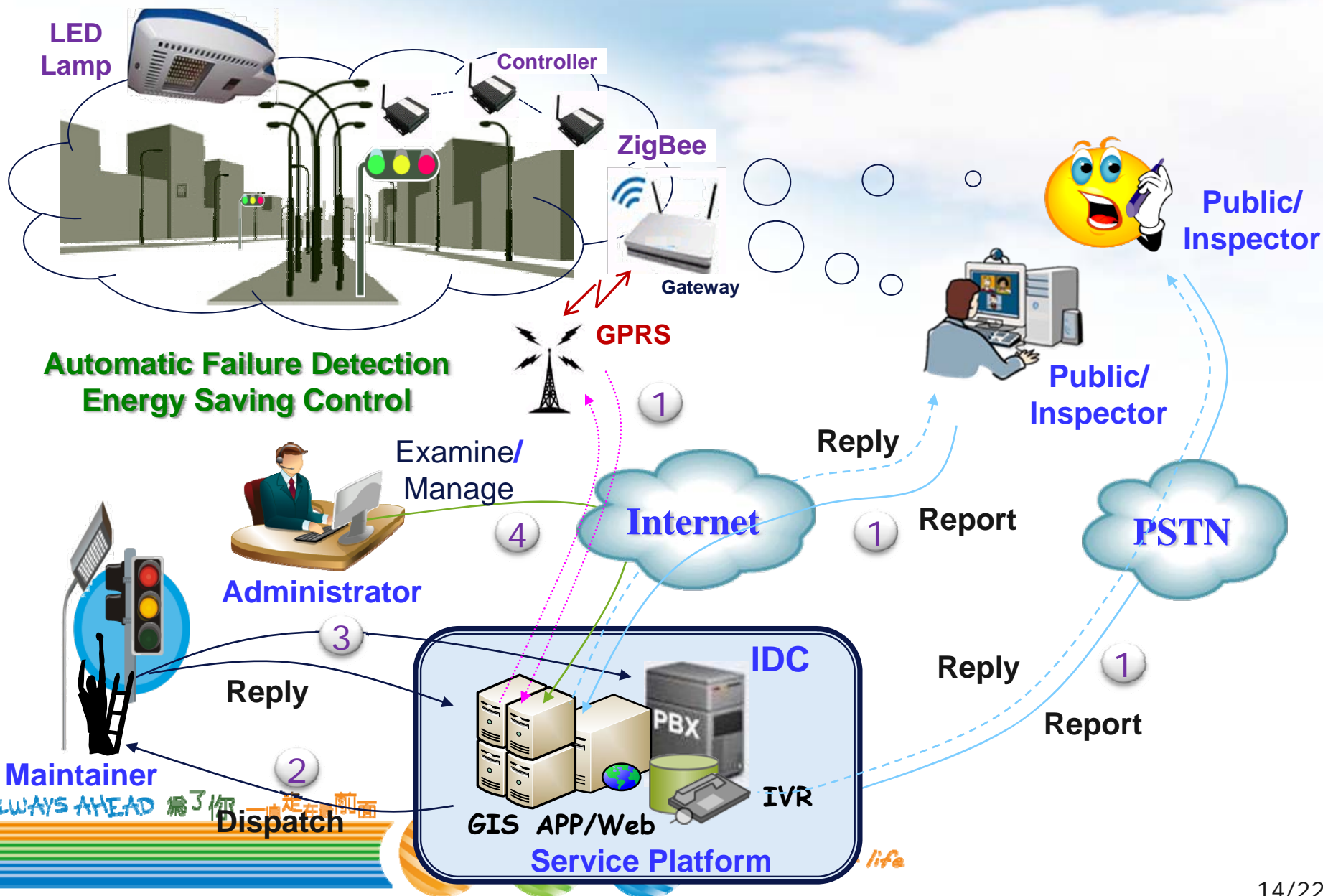


# Smart Energy Saving Services

- Providing centralized monitoring & management for electric power system, air conditioner, lighting and heat pump
- Applying to buildings, factories, hospitals and schools
- Saving more than 23% energy via iEN service in some cases



# Street Lighting Administration System



# ITS/Telematics Services

## For Enterprise:

- ❖ **CVOS (Commercial Vehicle Operation Services)**
  - Fleet Management System
  - Taxi Dispatching and Management System
- ❖ **APTS (Advanced Public Transportation Services)**

## For Individual:

- **ATIS (Advanced Traveler Information Services)**
  - Driver Service
  - Pedestrian Service
- **Traffic Information Service**



In the case of Taxi Dispatching,  
Revenue Increased 20%,  
Vacant Time Reduced 50%



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# Smart Community Services

- A total solution to satisfy residential and community requirements.



Door Access Control  
Parking Lot Management System



Intercom Access



Community  
Video  
Surveillance

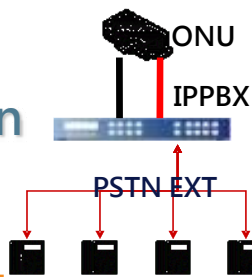


Central  
Monitoring

iEN,  
Community  
Energy  
Saving



Unified  
Communication  
Service



社區資訊  
Community  
Web Service  
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Property  
Management

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# Video Surveillance Services



CCD Camera

⋮



CCD Camera

⋮



CCD Camera

⋮



CCD Camera

⋮



IP Camera

DVS / DVR / NVR

⋮

DVS / DVR / NVR

⋮



VPN/Internet



Control Center



Server Farm

Management system

—●— Coaxial cable  
—●— Ethernet

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# Emergency Notification Services



- **Notify target**
- **Pre-defined**
    - Database
  - **Location relevant**
    - GIS+ Database

- **Notify message**
- **PSTN**
    - Voice
  - **Mobile**
    - Voice & SMS

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# 2010 TAIPEI INT'L FLORA EXPO

## Flower Guide via NFC Handset



NFC Bluetooth  
dongle



電子  
體驗章

## Interactive Digital Signage



- Real-time EXPO information Broadcast
- Advertise Broadcast
- Coupon Download



2010臺北國際花卉博覽會  
TAIPEI INT'L FLORA EXPO  
2010/10/6 ~ 2011/4/25



Powered by Chunghwa Telecom



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## Mobile Wallet Shopping



- EXPO Information
- Point of Interests
- Coupon Download
- Electronic Memorial Stamp
- Memorial Cards
- Coupon Area

## Multimedia Information Kiosk





# IoT Enrich the ICT Services

Ubiquitous Sensing



Reliable Transmitting



Intelligent Computing

Services



Applications/  
Services

The global revenue of IoT will be 30 times higher than the Internet.

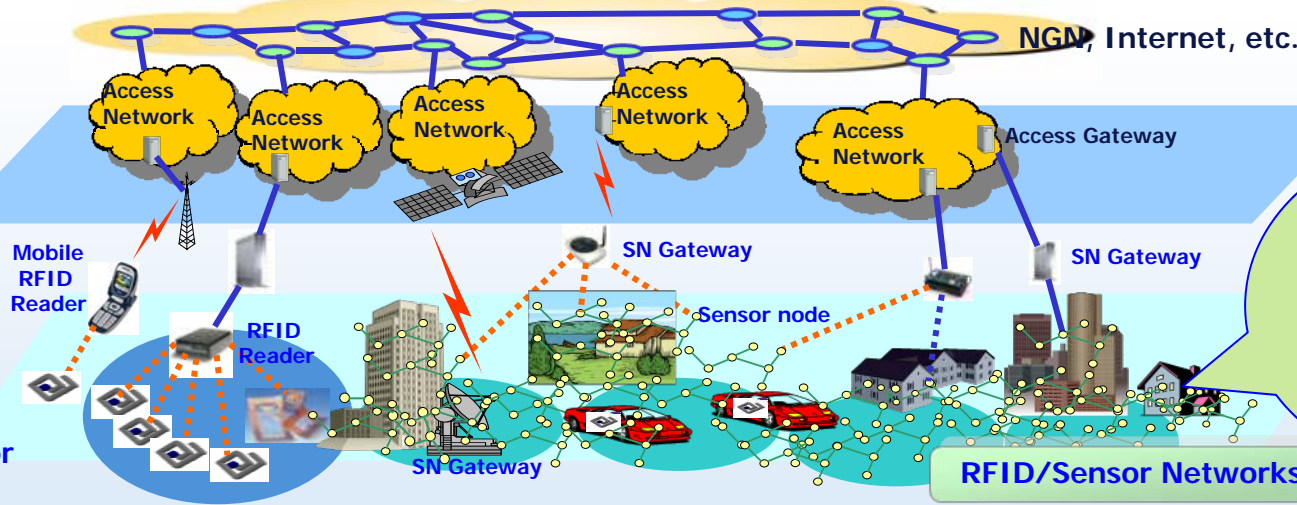
- Forrester Research



Middleware

M2M traffic will grow 40-fold from 2010 to 2015, at a CAGR of 109 %.

- Cisco VNI 2010-2015



RFID/Sensor Networks

RFID/Sensor Networks

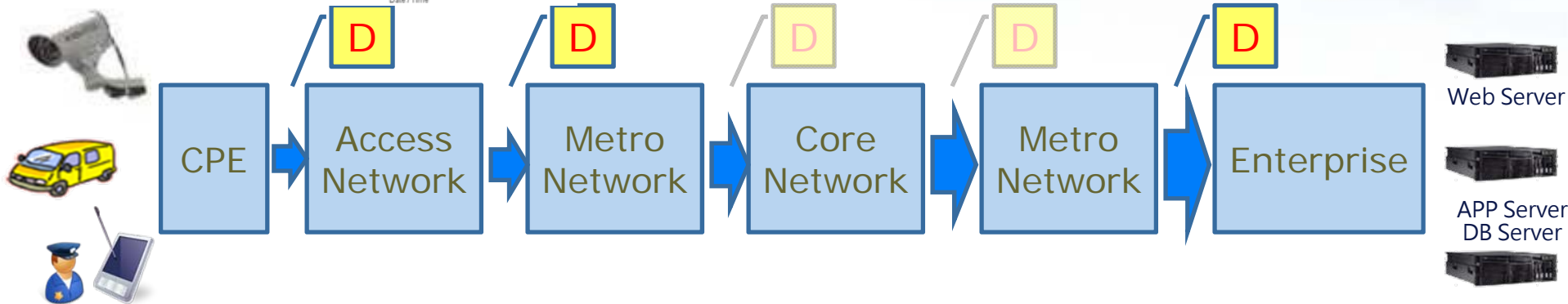
More than 50B devices will connect to the Internet by 2020.

- Ericsson



# CHT's Interests in Green IoT

## ❖ Study IoT Path model & Traffic model



## ❖ Traffic characteristics

- latency, jitter, packet-loss, packet-efficiency, ...





中華電信  
Chunghwa Telecom

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attention!



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