



한국에너지자원기술기획평가원

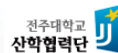


Development and Field Test-based Verification of Integrated Assessment and Diagnosing System for the Improvement of Building Energy Performance

BEMS Case study [Indonesia]

Woorizen Co.,Ltd

2015. 06.



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1. Summary

1-1) Research Summary

1-2) Background

1-3) Technical Challenge

1-4) Final System






1-1. Research Summary

 <p>KETEP KOREA INSTITUTE OF ENERGY TECHNOLOGY EVALUATION AND PLANNING</p>	<p>◆ Development and Field Test-based Verification of Integrated Assessment and Diagnosing System for the Improvement of Building Energy Performance</p>
<p>Leading Organization</p>	<p>◆ Woorizen Co., Ltd.</p>
<p>Research Period</p>	<p>◆ Total : From June 1st, 2014 to May 31st, 2017 (36 Month)</p>
<p># of Researchers</p>	<p>◆ Total number of researchers : 189 People</p>
<p>Participating Organization</p>	<p>◆ ETRI(Electronics and Telecommunication Research Institute), Jeon Ju University, ESRU StrathClyde Univ. in UK. ◆ Korea Appraisal Board, Nuri Telecom Co., Ltd. HanMi Mechanics Co., Ltd. IBS Korea Incorporated Association.</p>



1-2. Background

> BEMS : Needs Short-term, low cost Smart Metering.



BEMS ?
Expensive.
Difficult.
No man-power to
Manage Energy.



The more you can see,
the more saving you can
get



BEMS



1-3 Technical Challenge

➤ Ways to participate, cost, saving for Energy Efficiency

Challenge

How can End-User Participate?

How to find the target building for energy efficiency

Short-term/Low cost?

Continuous Saving?

Solution

Energy profiler

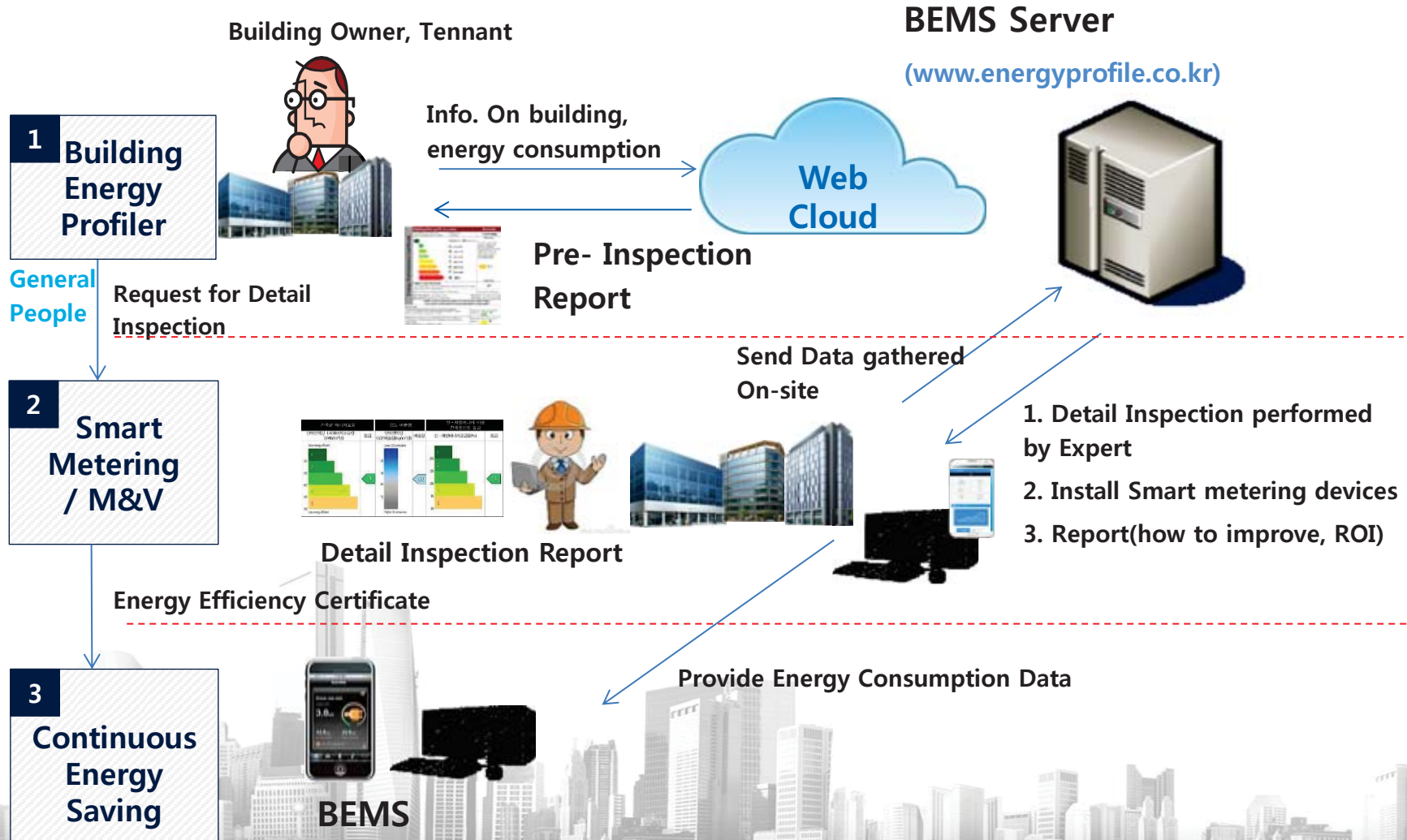
Smart metering
[PLC Modem+Wireless sensor]

BEMS
[Captology]



1-4. Final System

> System Configuration



2. Building Energy Profiler

2-1) Objectives

2-2) Energy Profiler





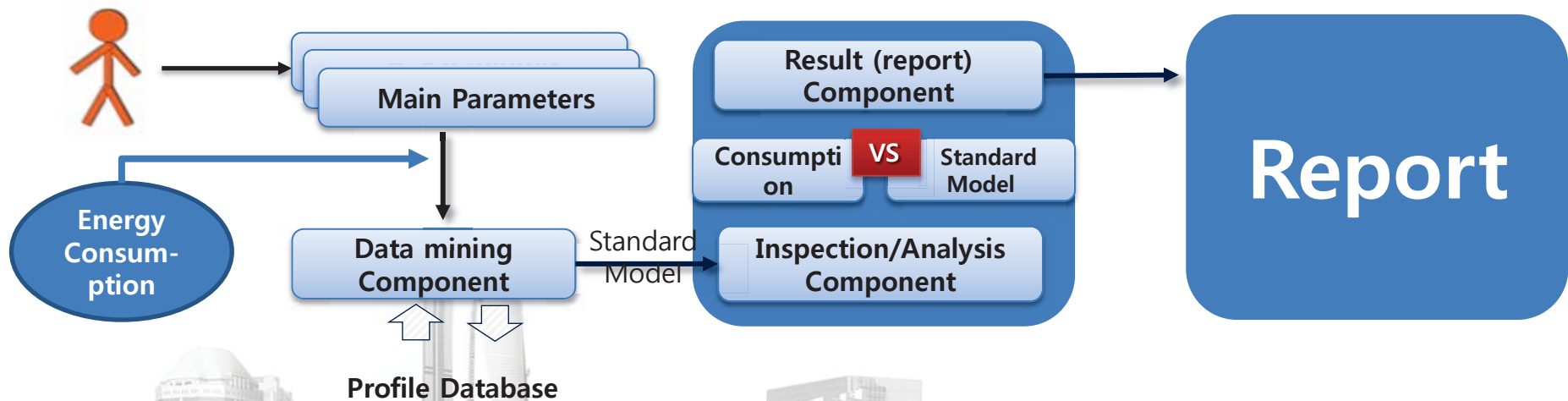
2-1. Building Energy Profiler

➤ Objective : Building Energy Benchmark, Self Inspection, Voluntary Participation

User friendly : Non-expert can use this.

Minimum Input : Precise Simulation tool requires too many Inputs.


Output : Provide Building Energy Benchmark, Inspection Report.





2-1. Building Energy Profiler

Web : www.energyprofile.co.kr

App :  App Store

 Google play

> Building Energy Profiler(Input)

Input Building Info., Facility, Windows/Walls, Plants, Energy Consumption data



1 Basic Info.

Building Info.

What is the name of the building to be inspected?

Building

Address of the building mentioned above

Address

The year the building was completed

Year

Total # of stories of the building.

Ground floors Underground floors

Gross Floor Area.

Number of Elevators

Size m² Elevators

Average # of Occupants.

People (Many, Average, A few)

Cancel

Save

Next >>

Cancel

Save

<< Previous

Next >>

5 Equipment & Operation

Heating/Cooling

Heating/Cooling Operation Status

Individual Heating/Cooling Central Heating/Cooling District Cooling/Heating Individual + Central Cooling/Heating

BHP Default Value Process

Absorption
Centrifugal

Walls



Open Type Room



Partition



Partition + (room)

Plywood + Plastic
Default Value Process

Plywood + Plastic + (Glass)
Default Value Process



2-1. Building Energy Profiler

Web : www.energyprofile.co.kr

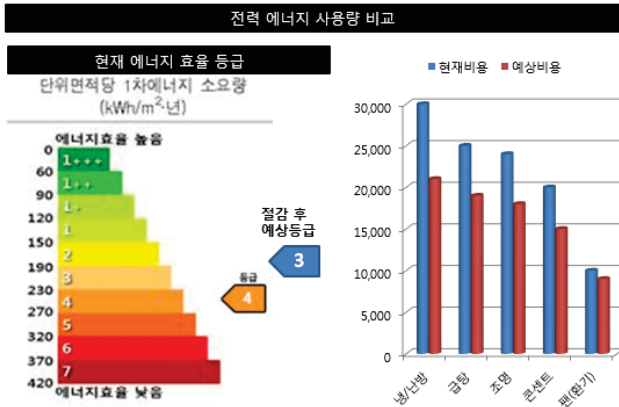
App :  
App Store Google play

> Building Energy Profiler(Report)

- Daily, Monthly, Seasonal Energy Consumption for a year (Benchmark)
- Report on saved cost after Retrofit

에너지 진단 리포트

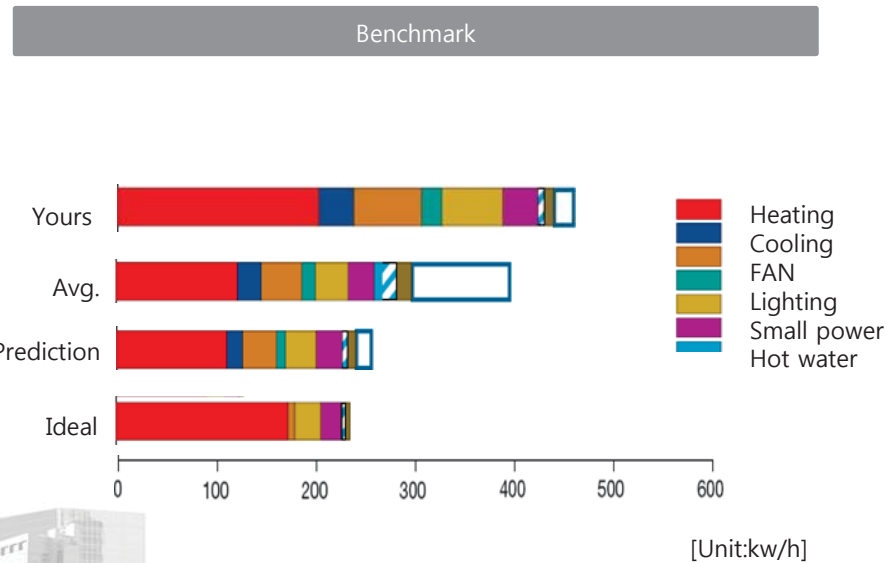
2014.12.05



본 건물의 예상 에너지 비용

	현재 비용	예상 비용	예상 절감액
조명	₩652,323 (3년간)	₩360,082 (3년간)	3년간 ₩4,983,753 절감 가능
난방	₩7,728,731 (3년간)	₩3,606,045 (3년간)	
온수	₩955,002 (3년간)	₩386,175 (3년간)	
합계	₩9,336,057	₩4,352,304	

※ 표시방법
 평균 : 표준건축물의 사용량과 비교하여 표시.
 예상 : 시뮬레이션에서 적정 사용량을 계산하여 표시.
 최저 : 표준건축물에서 가장 최저의 사용량을 표시
 ※ 표준건축물의 사용량은 동일 지온년, 동일 면적의 평균사용량을 표시



3. Smart Metering

3-1) Power Line Communication

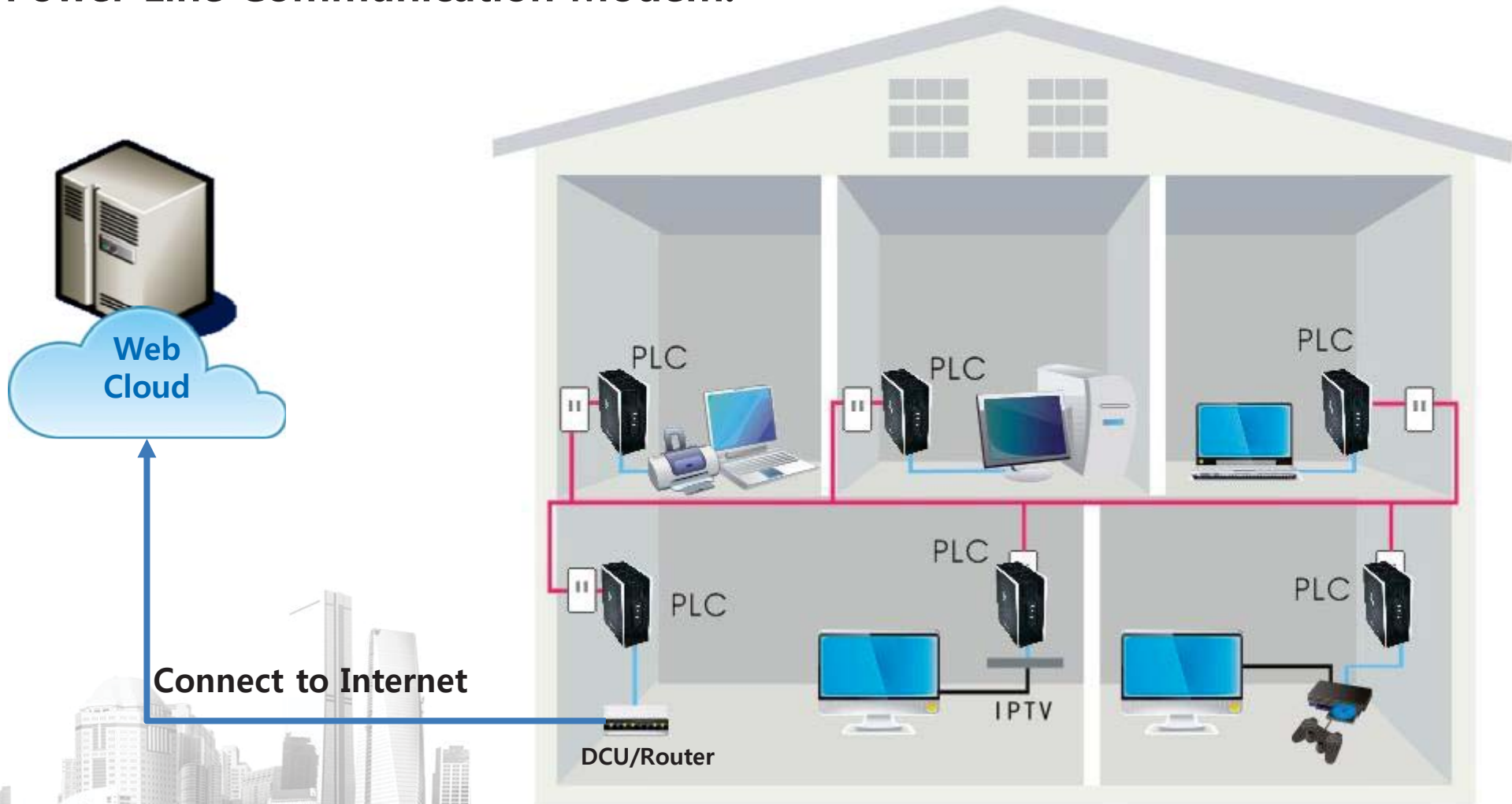
3-2) Clamp type sub-metering, Wireless sensor





3-1. Power Line Communication Modem.

> Power Line Communication Modem.





3-2. Clamp type sub-metering, Wireless sensor

> Smart metering



[Low-Frequency PLC Modem]

+



[Clamp Type Sub-metering]

+



[Wireless Sensor]
[Compatible with Modbus]

4. Captology

4-1) Definition

4-2) Praticice



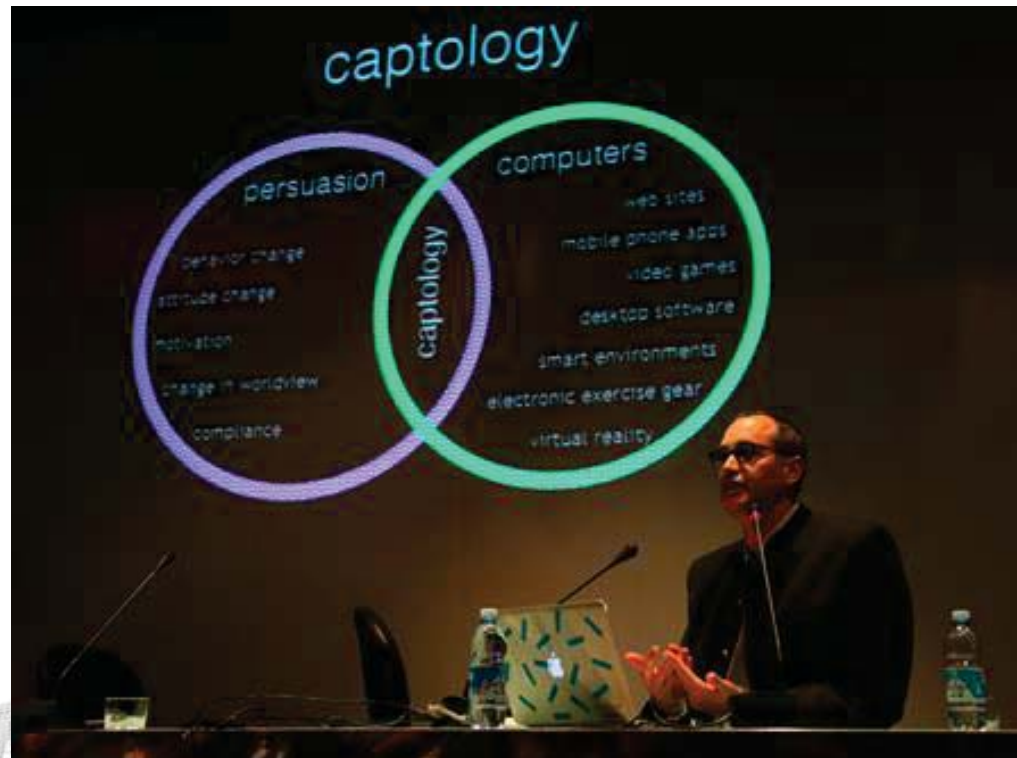


4-1. Captology

> What is Captology?

Computers As Persuasive Technologies = CAPT.

The best way to save energy is through Human being's mind-set and own effort





4-2. Captology

➤ Practice : E-ON, Sweden.

Using Symbols



Smart device + Real-time feedback.



5. BEMS Case Study

5-1) Case Study

5-2) Sub-Metering and Wireless sensor

5-3) System Configuration





5-1. BEMS Case Study

> Case Study : oooo, Jakarta

☆ Target Saving: 20%/year

★ Predicted Saving: 25%/year or More

Location : Jakarta, Indonesia

Size : Underground :2, Ground: 15

Completed : 1994

Cooling System : (CAV)

Capacity(Electricity) : 1200 KVA

Building Energy Inspection

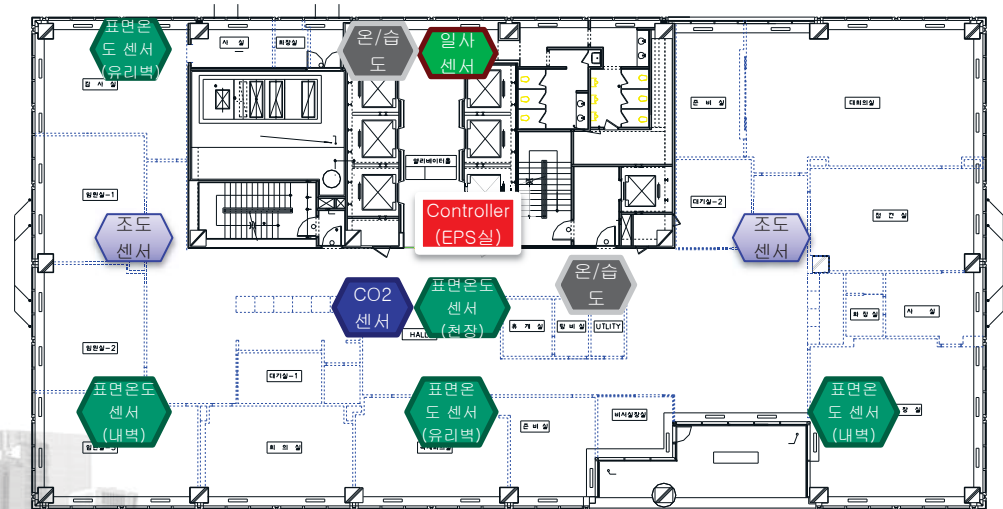
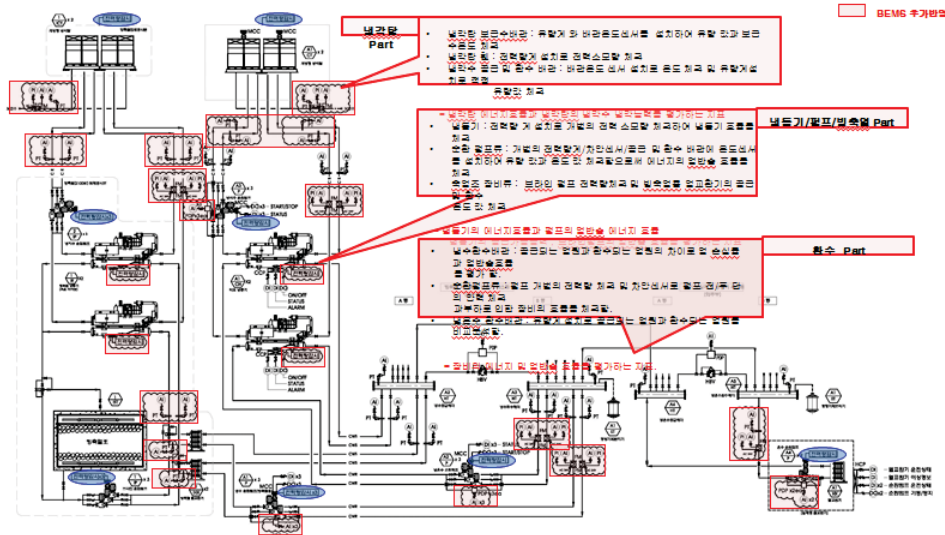
Consumption Analysis



5-2. Sub-Metering and Wireless sensor

Smart metering & Wireless Sensor

- Install Sub-metering devices per Zone, based on Dynamic Load).
- Install CO2 Emission Sensors, Temp./Humidity





5-2. Sub-Metering and Wireless sensor

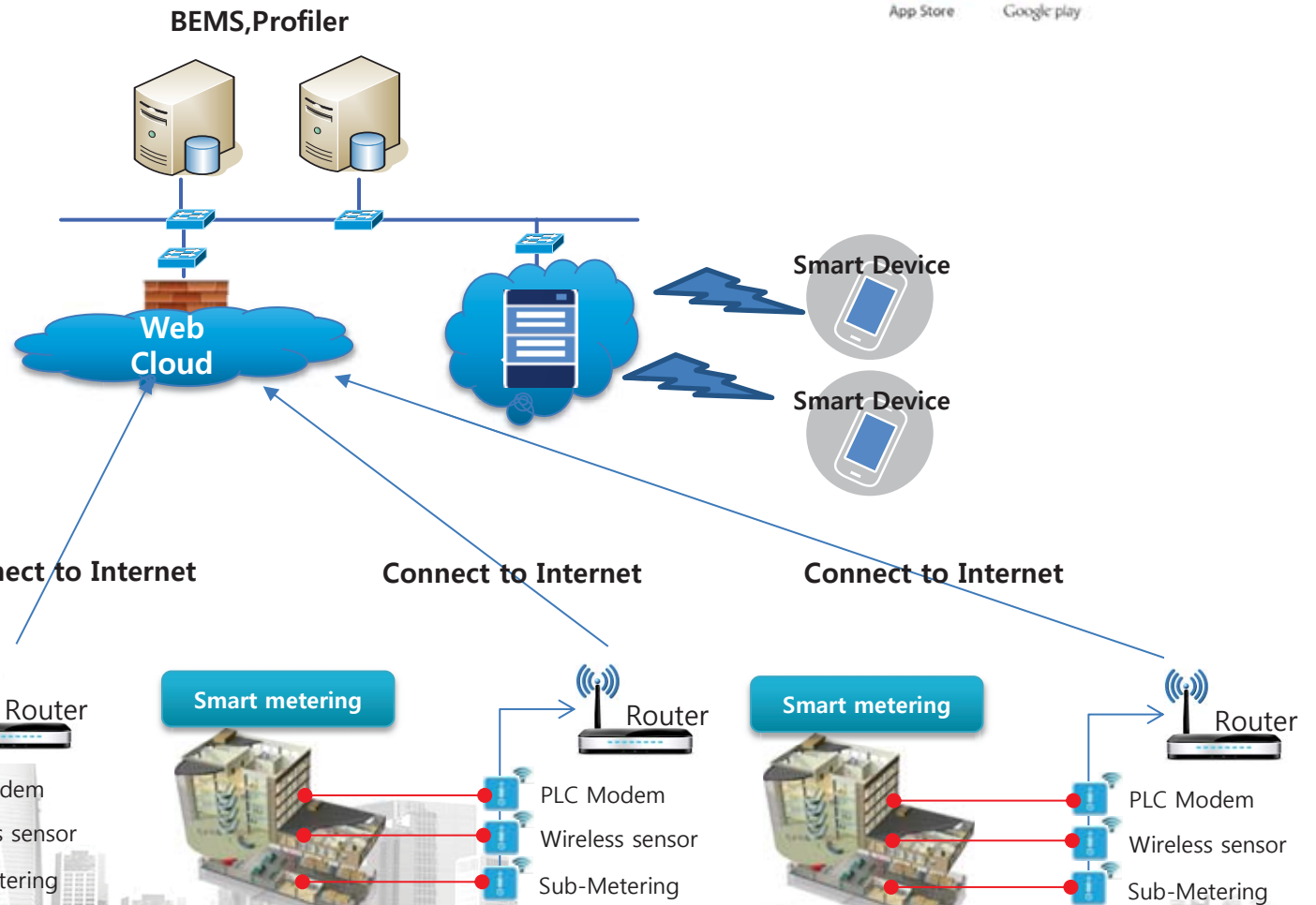
Item	Saving Potential	Description
Elec.	★★★★★	- Install Measurement System per different Load Type
Lighting	★★★★☆	- Install Lighting Sensors & Lighting Control System
Operating Performance	★★★★★	- EN-15232 : Evaluation of Cooling, Hot water, AHU, Lighting Control



5-3. System Configuration

> System Configuration

Web : www.energyprofile.co.kr



6. DEMO

6-1) Energy Profiler

6.2) BEMS Web, App





6-1. Energy Profiler

root ***** LOGIN JOIN



Home 건물관리 건물등록 진단 리포트 점검 시뮬레이션

Home

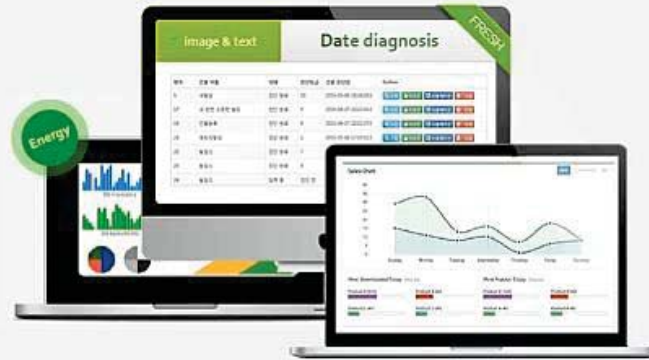
Building Information

Energy savings

등록한 건물 정보에 대한 건물에너지 표준 프로파일링 시스템을 통해 에너지 사용진단을 할 수 있습니다.

진단한 건물에 대한 정보와 에너지 점검 시뮬레이션을 할 수 있습니다.

more >



회원가입

건물에너지 표준프로파일링 시스템 사용 등록



건물등록

에너지 진단 및 시뮬레이션을 위한 건물 등록



건물관리

등록한 건물의 목록을 확인 및 관리



진단리포트

BESPS 시스템을 통한 에너지 사용진단



점검시뮬레이션

에너지 점검을 위한 에너지 점검 시뮬레이션

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6-2. BEMS Web, App

Q & A

Thank You