Smart Campus Implementation with ISO/IEC/IEEE 18880, based on **“Internet by Design”**

Hiroshi ESAKI, Ph.D.,

Professor, The University of Tokyo

Director, WIDE Project

Director, Green University of Tokyo Project

Board of Trustee, ISOC

Live E!

in 2005

ipv6

Building Automation WG
in 2003 at ipv6 Promotion Council

Collaboration
with Tokyo Gov.
since 2004

Established FNIC in2006
(Facility Network I

Sinc
(7th a

Smart Disaster Mitigation
with IIT-H/IMD
in Hyderabad city

Smart Energy Management

um
es

pic

in 2008

JGN2 plus

INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

IIT Hyderabad with IITH&IMD

清華大學 Tsinghua University

China-Japan Green IT
Project funded by MIC
in 2009

DISANET

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

FIAP in 2009
(Live E! architecture)

ISO IEC

JTC1 SC6 WP7

IEEE

IEEE 1888 in Feb.2011

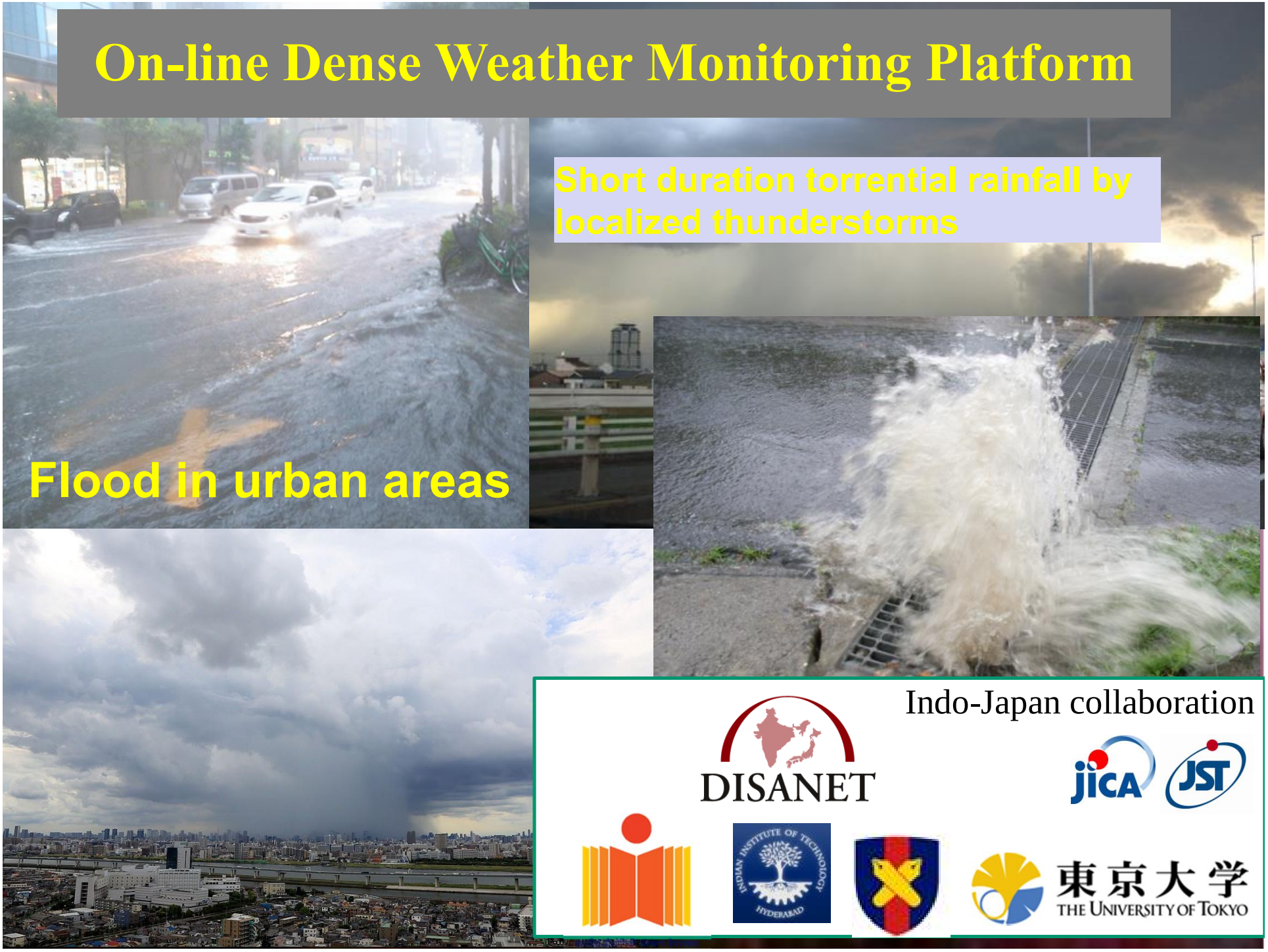
NIST

SGIP

BACnet

with NIST@USA
B2G in SGIP (Smart Grid Interoperability Panel)
toward CoS

On-line Dense Weather Monitoring Platform



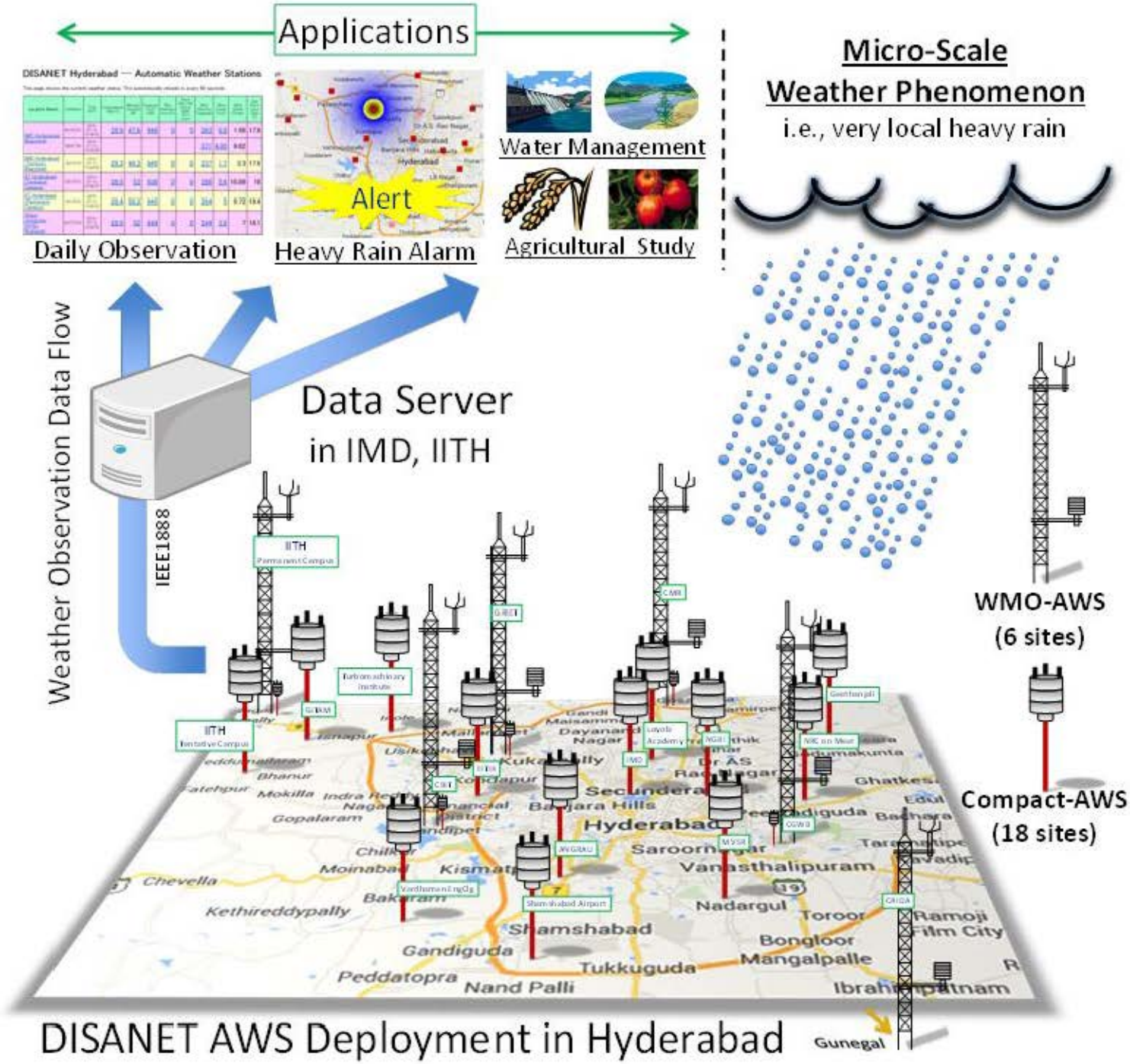
Indo-Japan collaboration

DISANET

JICA JST

INDIAN INSTITUTE OF TECHNOLOGY HYDERABAD

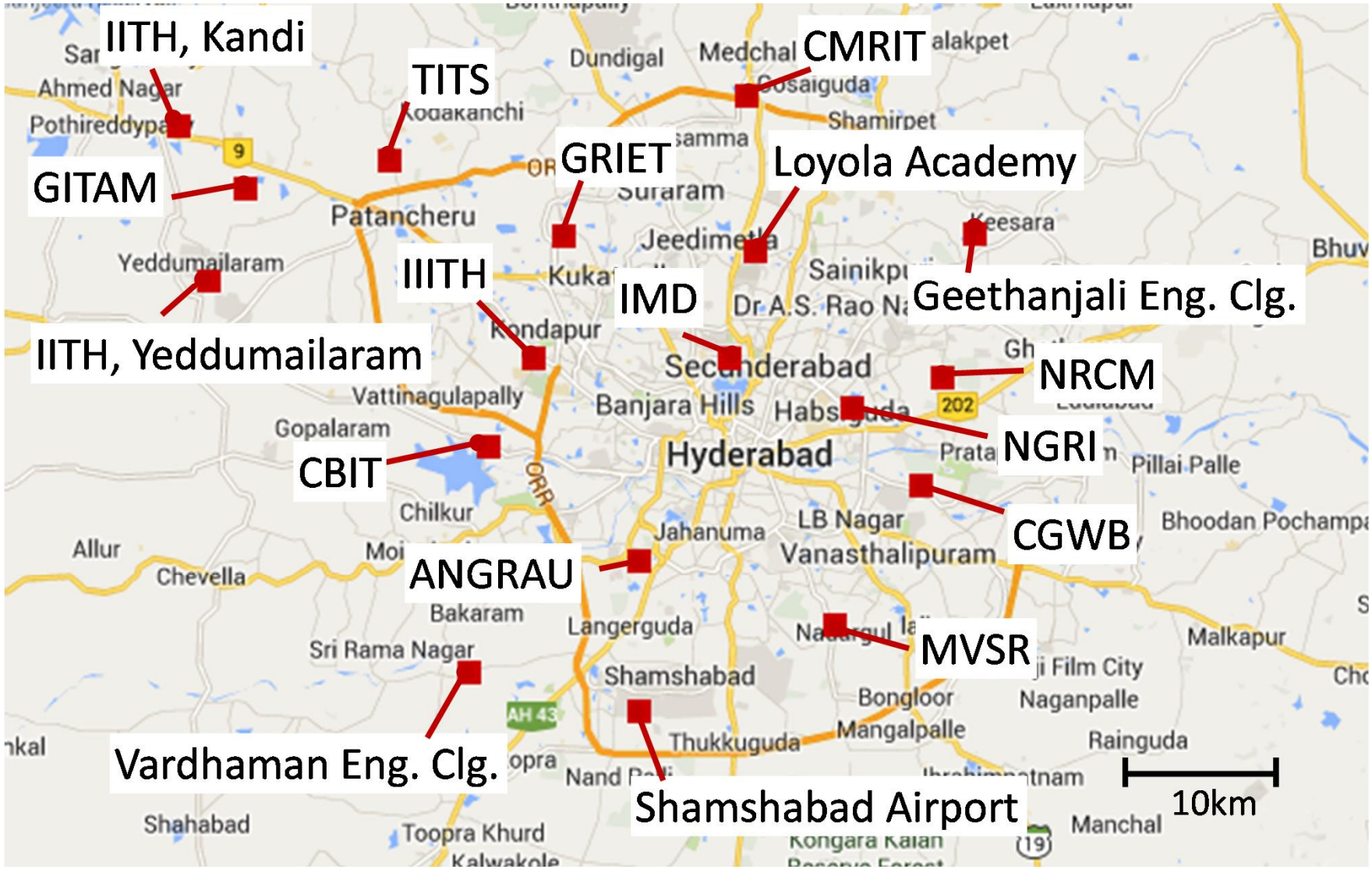
東京大学 THE UNIVERSITY OF TOKYO



DISANET AWS Deployment in Hyderabad

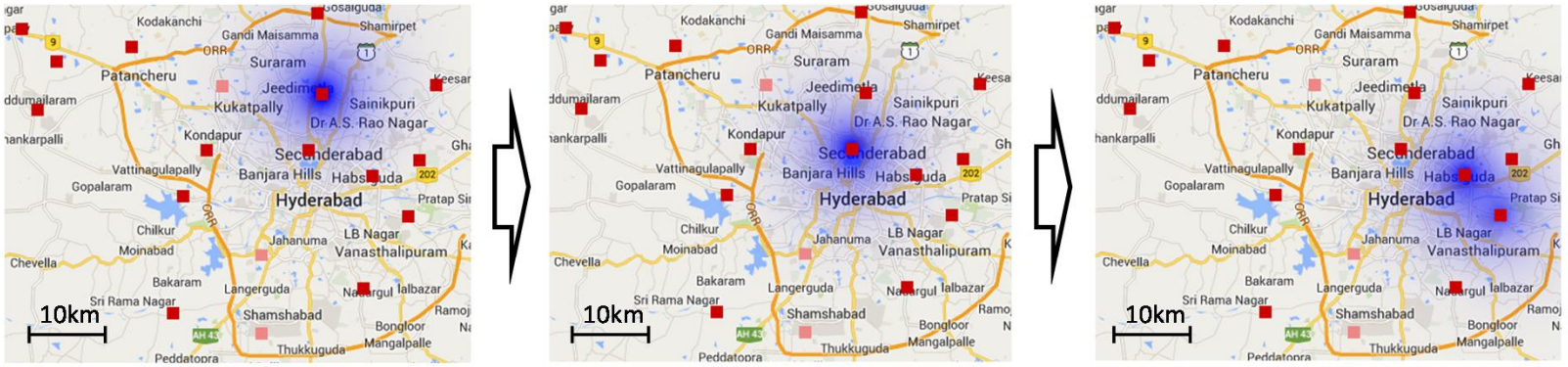
AWS installation in city of Hyderabad

6 WMO-Standard AWS and 18 Compact AWS



Local rain detection in 2014

June 15, 2014

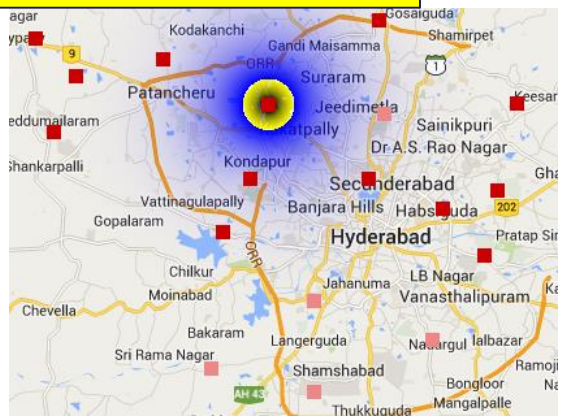


(a) 18:38
Loyola Academy 70.1 [mm/h]

(b) 18:55
IMD Begumpet 63.9 [mm/h]

(c) 19:10
NGRI 55.2[mm/h], CGWB 36.7[mm/h]

18:58, July 7, 2014



Gokaraju Rangaraju Institute of Engineering Technology (GRIET)

136.4 [mm/h]

Smart Energy Management at The Univ.of Tokyo in 2011

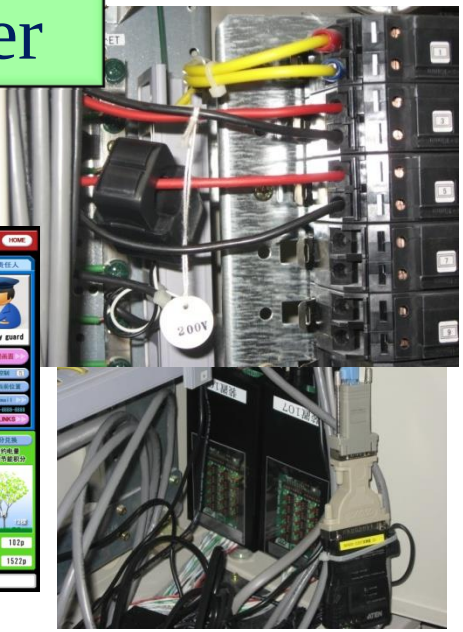
	Peak (2010)	Peak (2011)	Total (2011)	RoI
Major 5 campus	66 MW ($60M/yr)	69% (△31%)	75%-78% (22%-25%)	less than 1 month
Eng. No2 Bldg.	1 MW ($1M/yr)	56% (△44%)	69% (△31%)	2 yrs

12 Fl. EECS & Machinery Dept.

【Contributions】

1. Multi-Vender for sustainable innovation
2. Global Standards for procurement

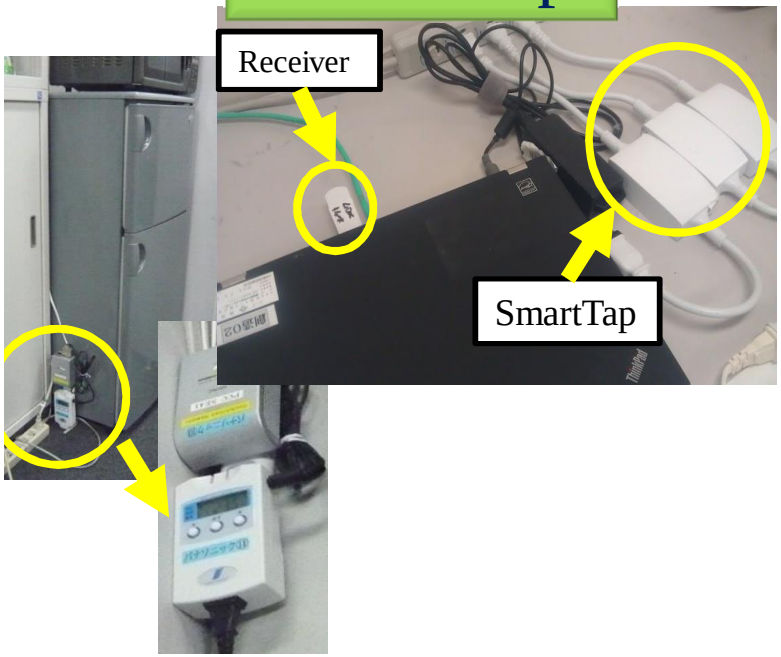
Smart Meter



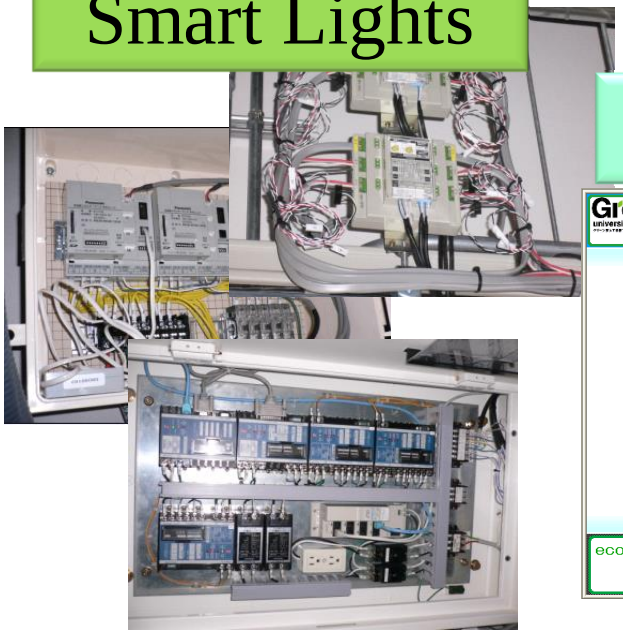
With Smart Phone

Smart Kiosk

Smart Tap

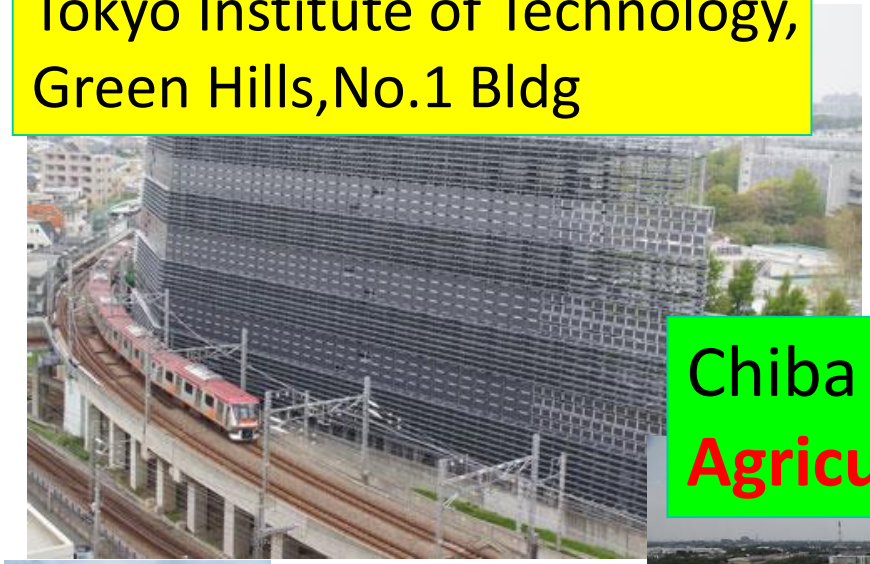


Smart Lights



Smart HVAC

Tokyo Institute of Technology,
Green Hills,No.1 Bldg



HQ, Otsuka Corp.

Chiba Univ.
Agriculture plant

Hitachi Info& Tele Eng Ltd.
Nakai Development Center

SEIKO Solutions
Factory in Thailand

- ✓**R&D campus**
- ✓**Office**
- ✓**Factory**
- ✓**Agriculture**
- ✓**CEMS (City)**

Global/International collaboration

1. **Beijing team** (e.g., Tsinghua Univ., China Telecom), **China**

   (*) Including Standardization: IEEE1888

2. **Chulalongkorn University, Thailand**
3. **IIT Hyderabad, India**
4. UCB v
5. SGIP

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6. NTU(
7. **Vietn**
8. iDA in
9. UMPS/LIP6/CNRS in Paris, **France**

भारतीय प्रौद्योगिकी संस्थान हैदराबाद
Indian Institute of Technology Hyderabad

IIT Hyderabad
Smart Building Collaboration

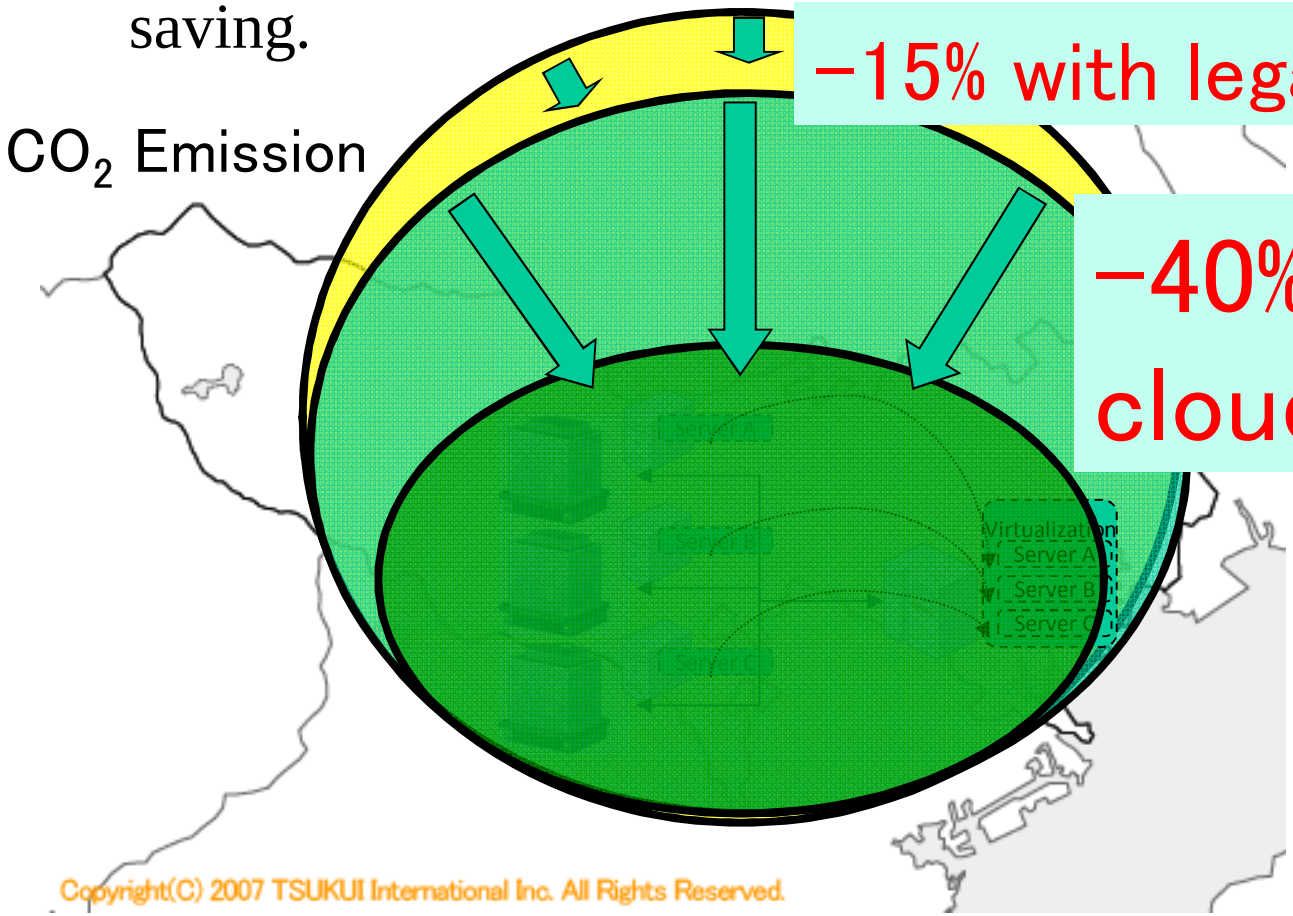
Strategic use of Cloud & Data Center,

Computers & Facilities into&on the Net (Cloud/DC)

東京大学
THE UNIVERSITY OF TOKYO

Strategic Energy Saving in Tokyo ?

1. Move and accommodate servers in the offices into iDC , hosting service, will lead to 15% energy saving
2. Vitalize the servers and integrate into a single physical machine, i.e., cloud computing, will lead to 40% energy saving.



Strategic Energy Saving in Tokyo ?

1. Mo nmodate servers in the offi ,
   host will lead to 15% energy sa
2. Vitali al
   machin ergy
   saving.

CO_2 Emissio

hosting

h

ting

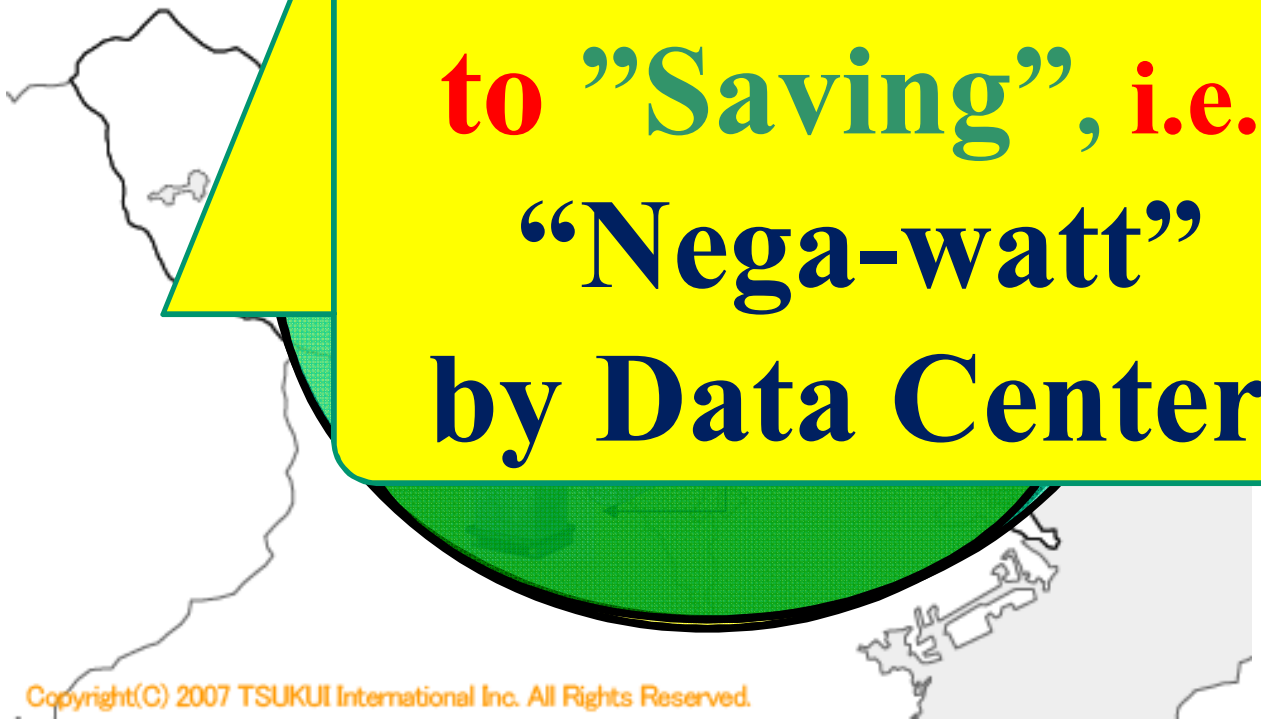
Energy

“Consumer”

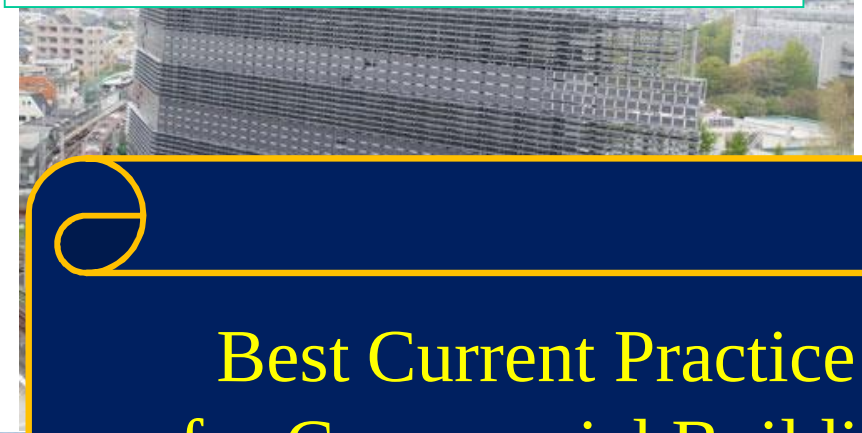
to ”Saving”, i.e.,

“Nega-watt”

by Data Center



Tokyo Institute of Technology,
Green Hills,No.1 Bldg



Microsoft Japan
HQ in Tokyo

Best Current Practice
for Commercial Building
and for Microsoft

1. Facility management control
   by ISO/IEC/IEEE18880
2. Servers go to Data Center
   = No server room in the bldg

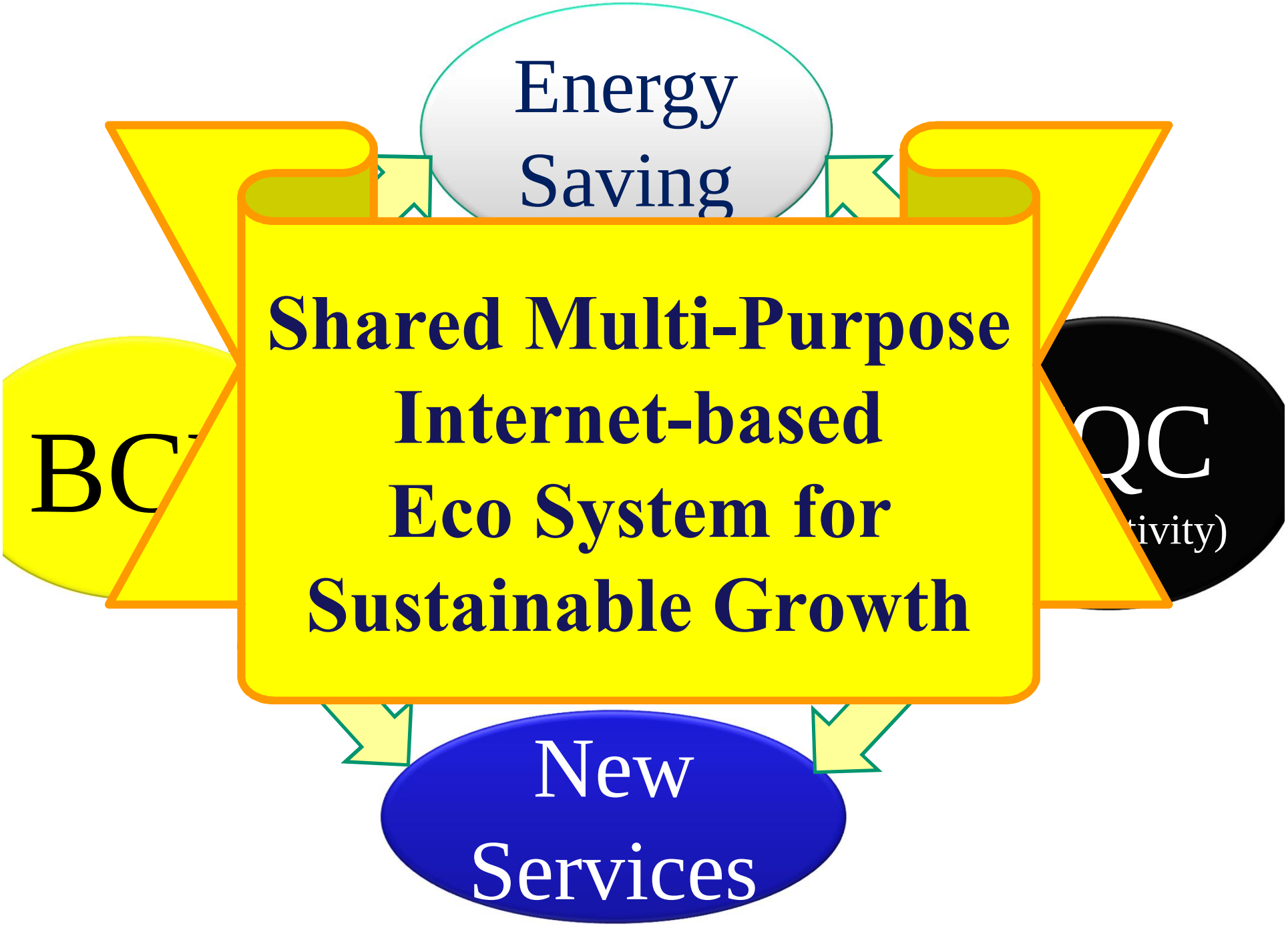
- ✓**Office**
- ✓**Factory**
- ✓**Agriculture**
- ✓**CEMS (City)**

SEIKO Solutions
Factory in Thailand

{New} Implication of Data Center ?

1. Could change from consumer to supplier
   - Possibility of DC power supply
2. 72 hour operation, after electric black-out
3. Power-generator function, including Hydrogen and heat.

- ✓ Critical Infrastructure for IT/ICT
- ✓ De-centralized energy source
- ✓ {short-term} ñenergy securityò


Energy
Saving
Shared Multi-Purpose
Internet-based
Eco System for
Sustainable Growth
BC
QC
tivity)
New
Services