

ICEBO/APCBC

Asia Pacific Conference on  
Building Commissioning

2006.11.7

Opening Address

Energy/Environment/Commissioning



/NESTEC

Nobuo Nakahara

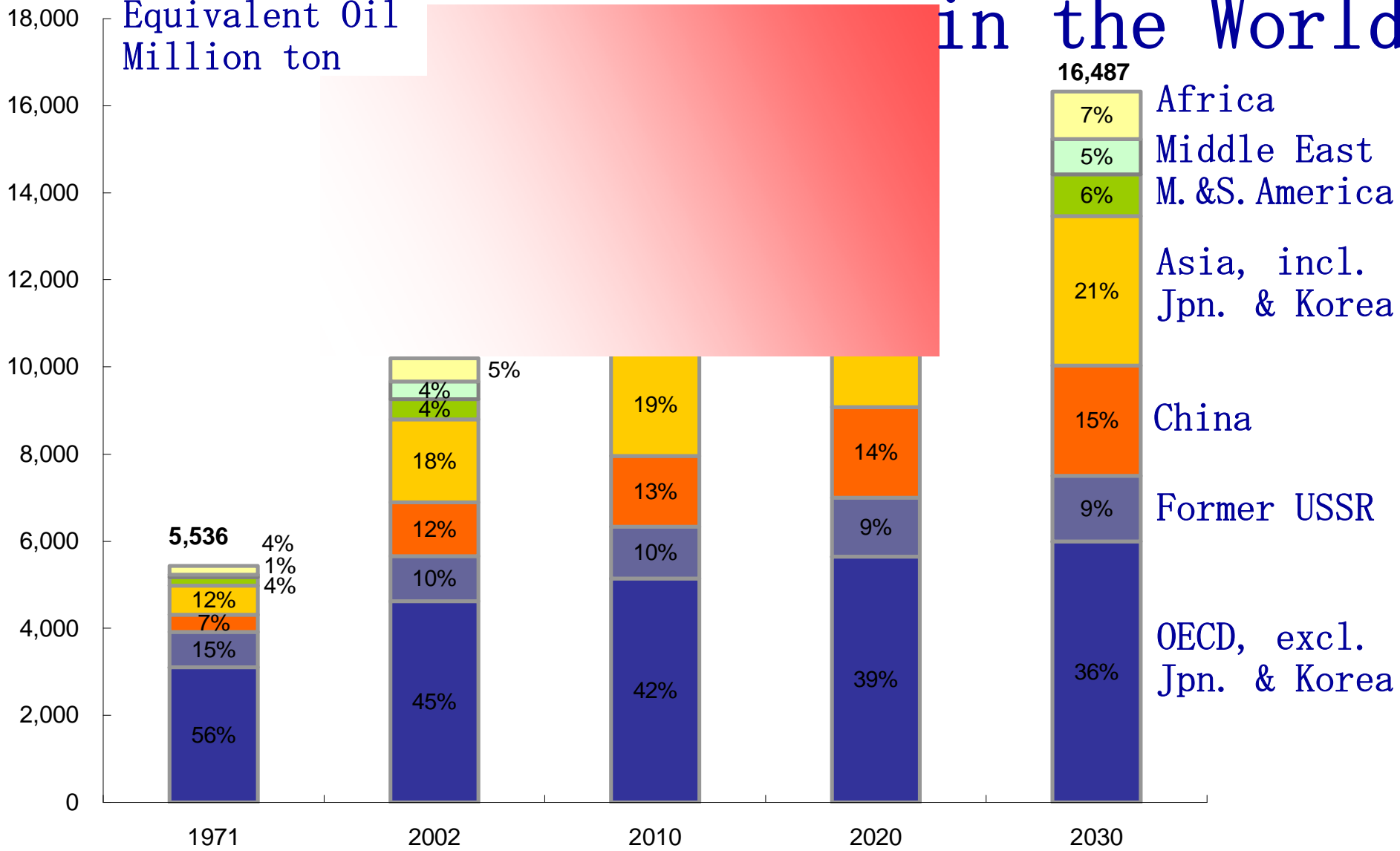
# Call for participation to International Conference for Asia Pacific at NCBC 2006

- Asia Pacific Conference on Building Commissioning, APCBC has been planned to kick-off in Shenzhen in Nov. 6-8, 2006, together with
  - Annex 47, IEA/ECBCS
  - ICEBO 2006
- HKBCxC, Hong Kong Building Commissioning Center, is to co-sponsor and other bodies from mainland China and Asian countries are expected to participate.
- Commissioning bodies such as PECCI, BCA, etc. in USA are desired to participate in this

# Actual and Estimated Energy Demand in the World

ESL/IC 06-11-224

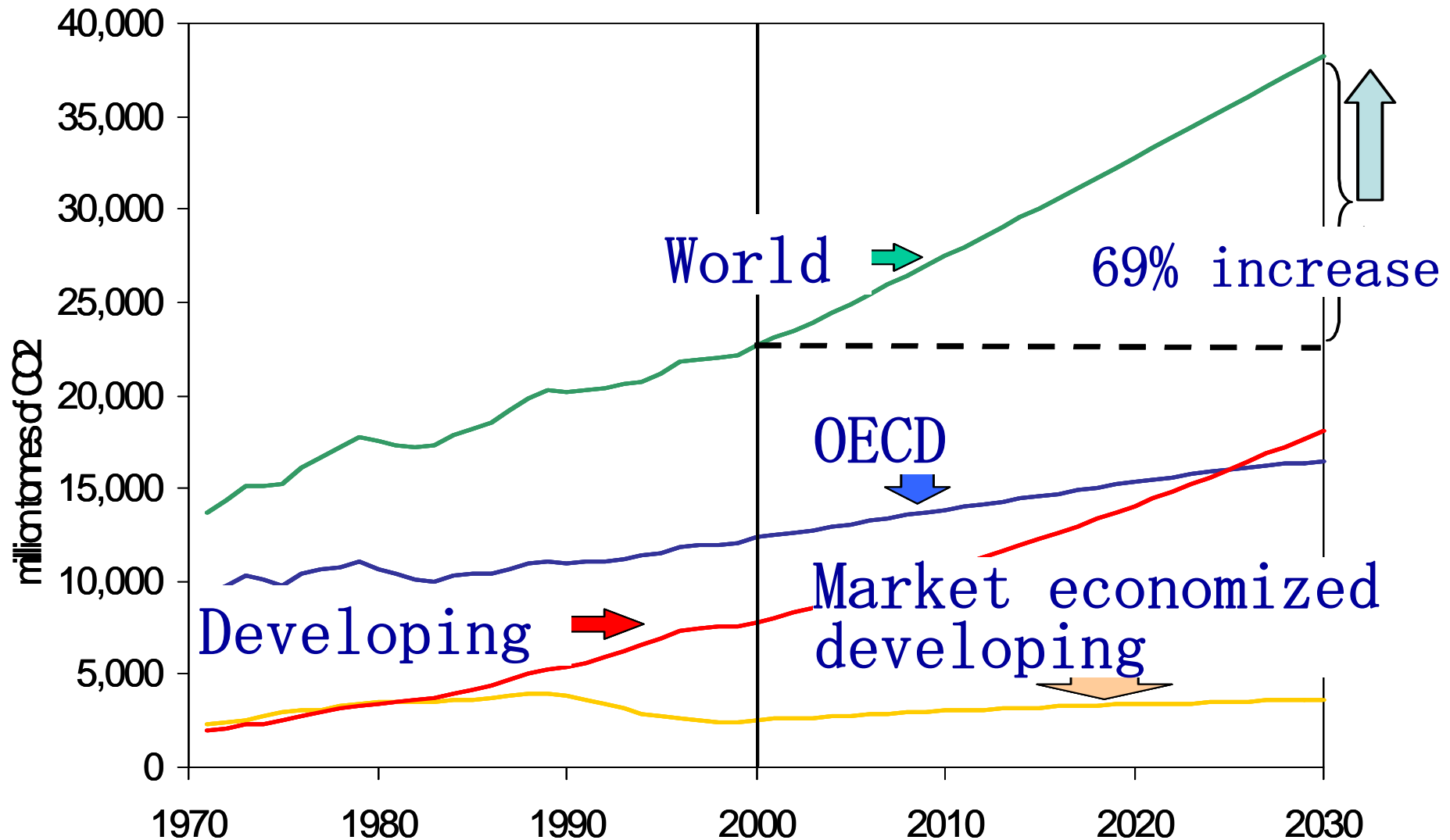
Equivalent Oil  
Million ton



Proceedings of the Sixth International Conference for Enhanced Building Operations, Shenzhen, China, November 6 - 9, 2006

From IEA/World Energy Outlook 2004

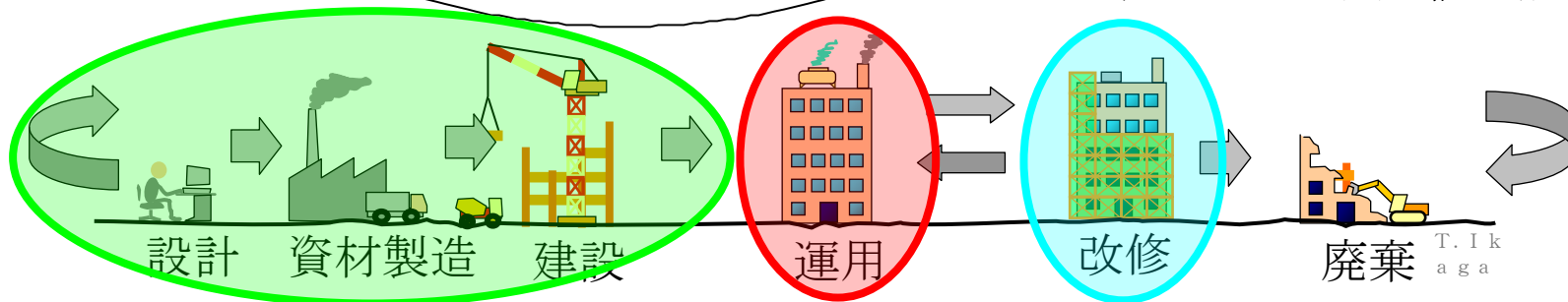
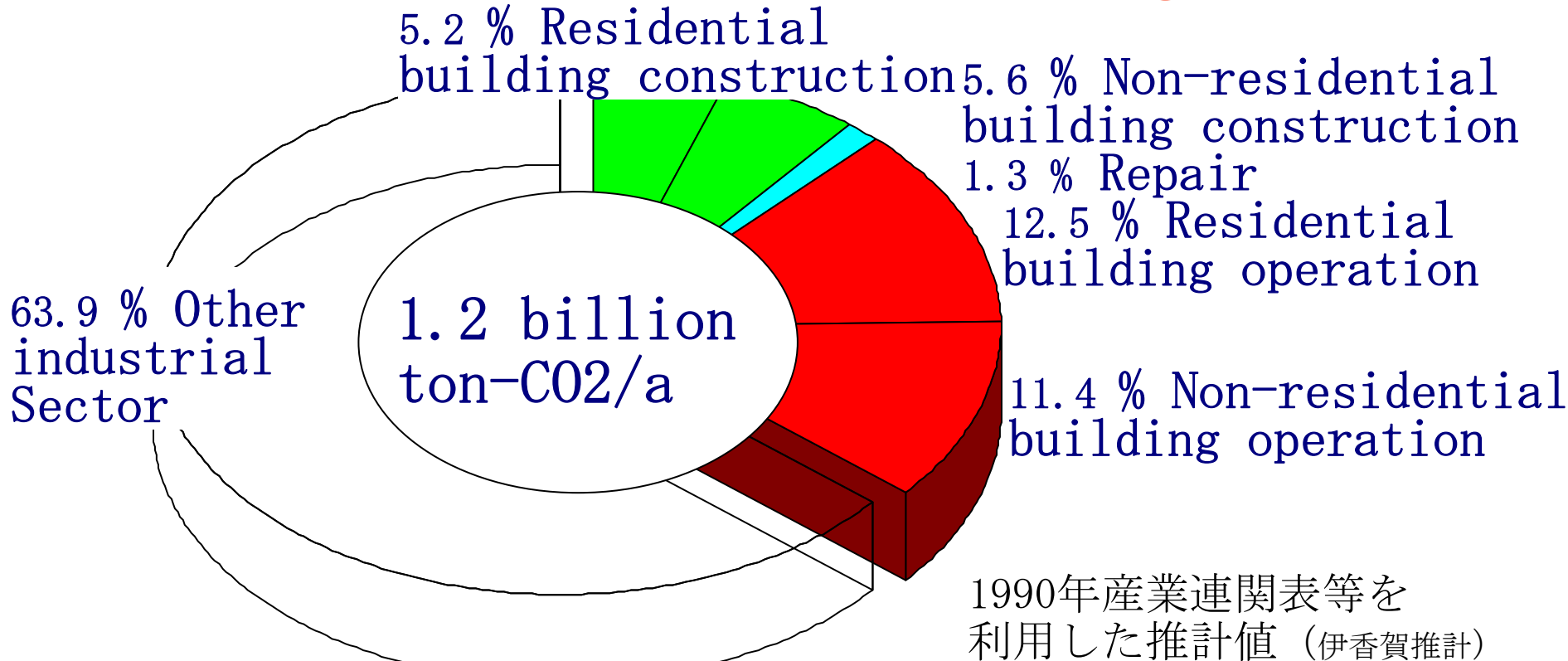
# Energy-originated CO<sub>2</sub> in the World



Proceedings of the Sixth International Conference for Enhanced Building Operations, Shenzhen, China, November 6 - 9, 2006

From data

# Origin of CO2 generation in Japan, ESL-C-06-11-324 A third comes from Building sector



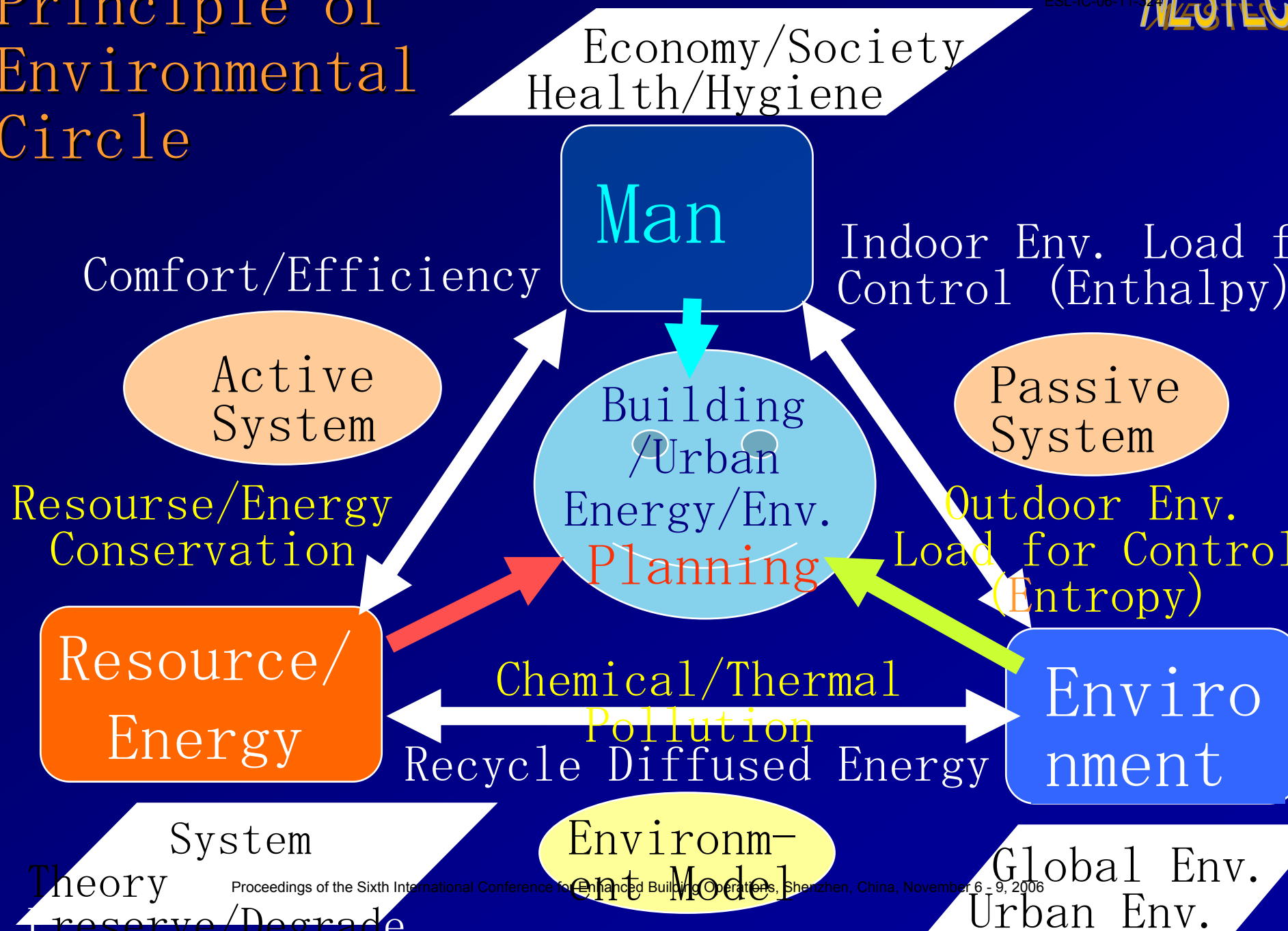
# Four Principles of Reformation of Building, Town and Globe

- Environmental Circle Principle
- Energy Conservation Principle
  - Commissioning Principle
  - Evaluation Principle

# How Building & Urban Energy System shall be completed and maintained?

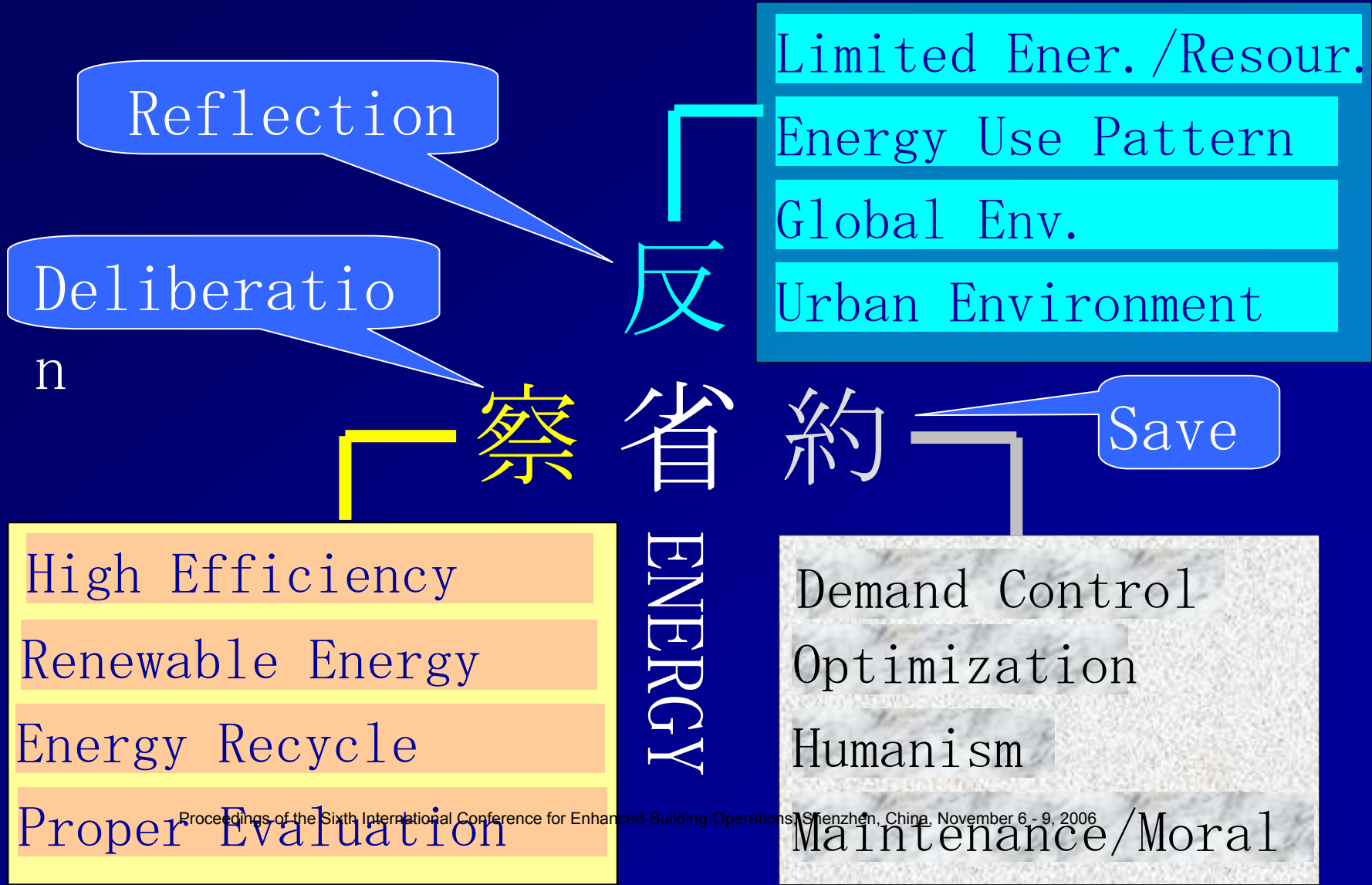
- Mechanism of Urban Environment State Change
  - Virtual/Vicious Circle of Man-Environment-Resource/Energy
- Principle of Energy Conservation
- Recognize the Big Effect of Commissioning Process from Program to Maintenance
- Proper and Unbiased Evaluation System for Energy / Environment/ Sustainability

# Principle of Environmental Circle





# Energy Conservation Principle



# Commissioning Application

- Life Cycle Commissioning
- Initial Commissioning
  - Total Initial Commissioning)
  - Partial Initial Commissioning)
    - Ex1 : Acceptance Step Commissioning
    - Ex2 : Program Phase Commissioning  
(Consulting)
    - Ex3 : Construction Phase Commissioning
- Retro Commissioning
- Continuous Commissioning

# What is Commissioning (Cx) ?

## --process definition

- the process to accomplish the real Owner's Project Requirements through building construction stage and continuing to operation and maintenance stage as the life-cycle process

## --global definition

- Commissioning is performed in order to keep the system in optimal condition through the life of the building from the viewpoints of environment, energy and facility usage

# Who manages Cx Process?

## Commissioning Authority (CA)

*CA shall be*

- nominated and paid directly by owner,
- individuals or organizations which are socially acknowledged as a bearer of fair mind with sufficient professional knowledge and management capability,
- the third personality concerning the project in concern
- preferably, standing-alone professional independent from design team and construction team

# Commissioning phases

# Production Stage

<b>Program Phase (Pre-Design Phase)</b>		<b>Design Phase</b>		<b>Elabolation Phase</b>
<b>Program Step</b>	<b>Planning Step</b>	<b>Preliminary Design Step</b>	<b>Working Design Step</b>	<b>Elabolation Step</b>

CA

Des.

Cont

RFP\_CA

RFP\_Des

Design  
Doc.

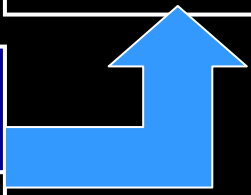
Bid/Order  
Contracting

OPR

Cx Spec.

Cx Plan

Const.  
Doc



# Production Stage

# Operation & Maintenance Stage

## Construction Phase

## Operation Phase (Occupancy and Operations Phase)

Construction Step

Acceptance Step

Post-Acceptance Step

Post-Post-Acceptance Step

ont.

Const. Doc.

Syst. Manual

TAB

FPT

Season. FPT

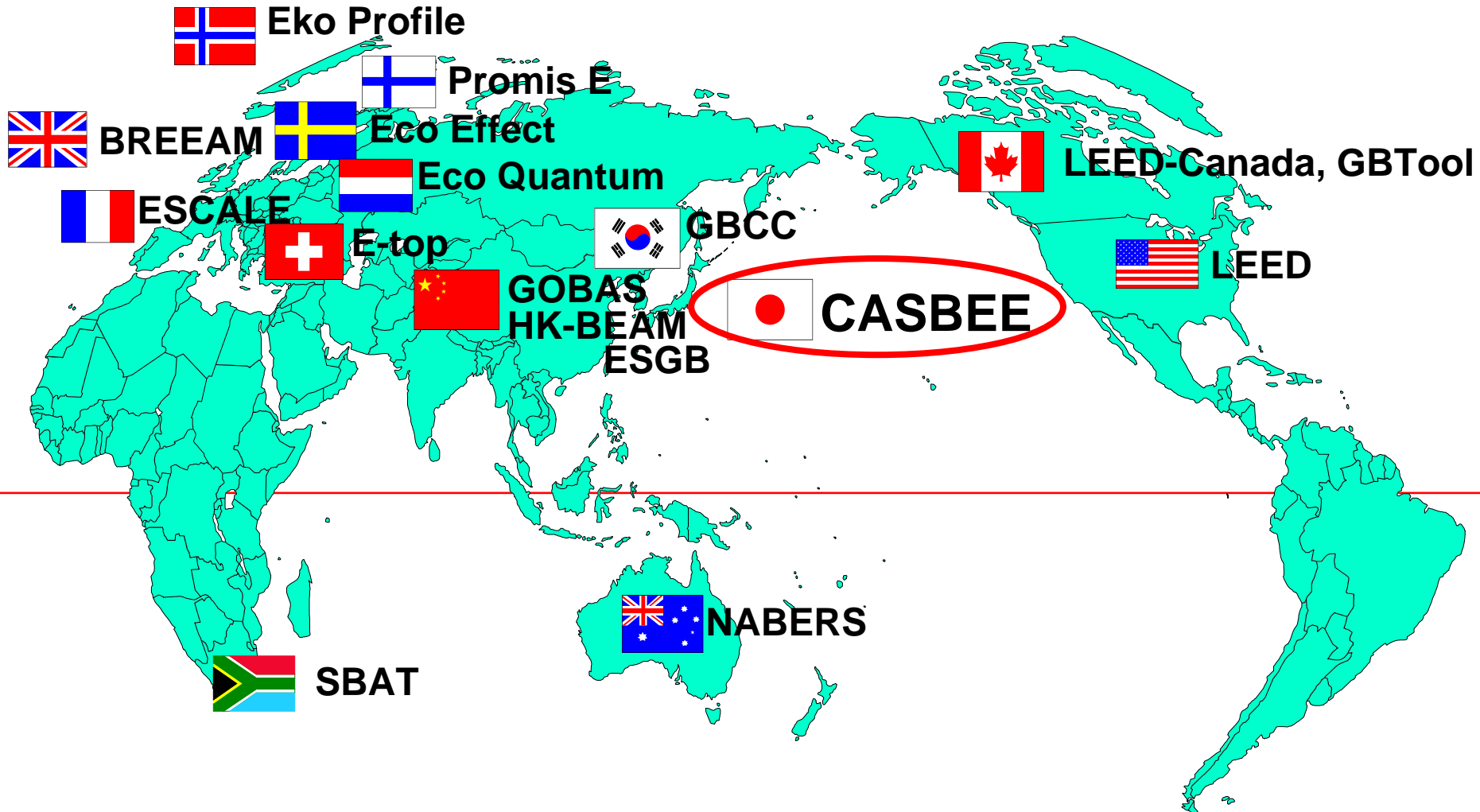
Re-Cx,  
On-going Cx  
Stage

Cx Plan\_update

Train.  
/edu.

Final  
Cx

# Evaluation System of Sustainable Building ESL-IC-06-11-324



## LEED-NC 2.2 Prerequisite 1: Fundamental Cx of Building Energy Systems

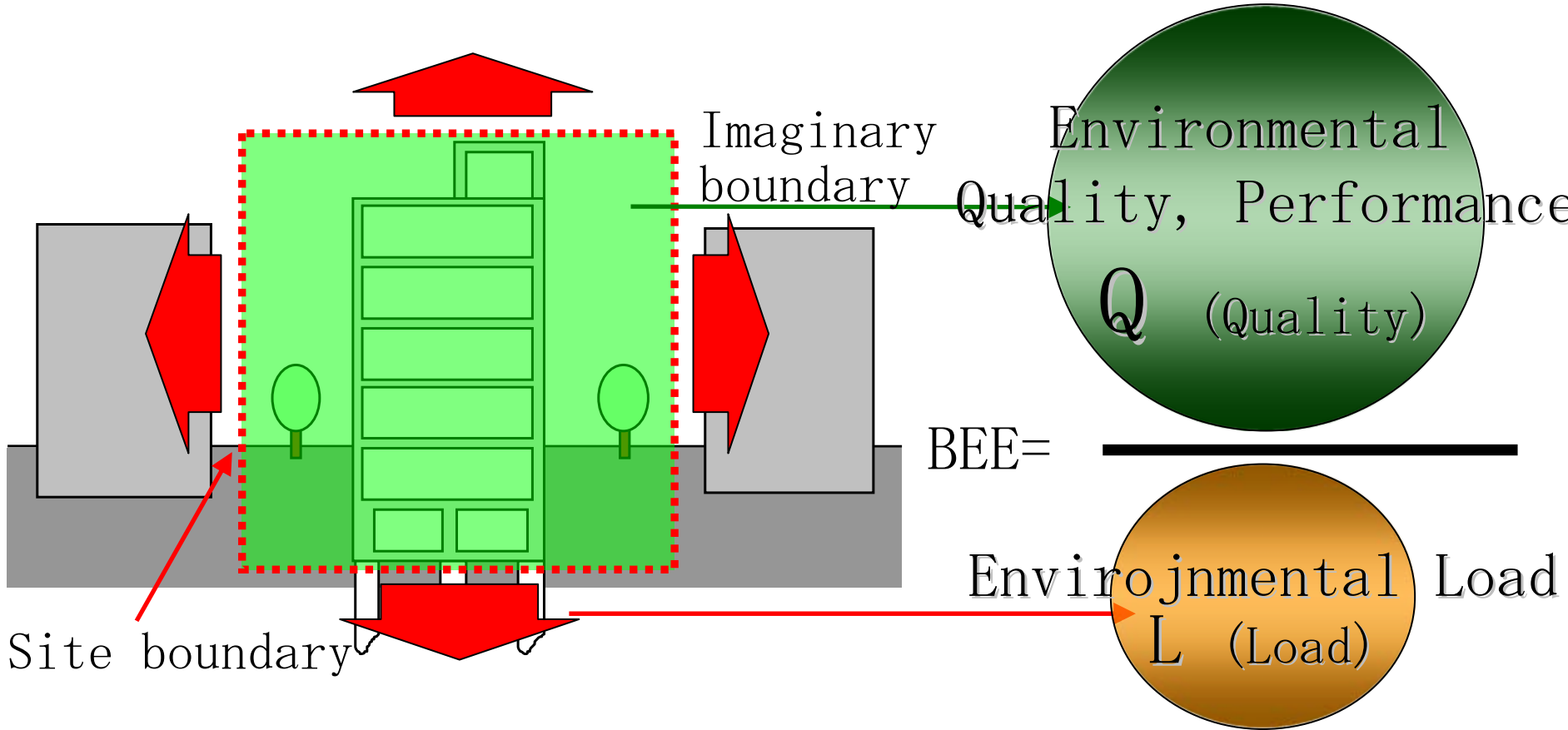
- Designate an individual as the Commissioning Authority (CxA) to lead, review and oversee the completion of the commissioning process activities.
- The Owner shall document the Owner's Project Requirements (OPR)
- Develop and incorporate commissioning requirements into the construction documents.
- Develop and implement a commissioning plan.
- Verify the installation and performance of the systems to be commissioned.



# CASBEE (Japan)

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Comprehensive Assessment System for Building Environmental Efficiency



Realize Buildings with better Q&P

⇒ BEE (Building Eco Efficiency)

emitting less Environmental Load

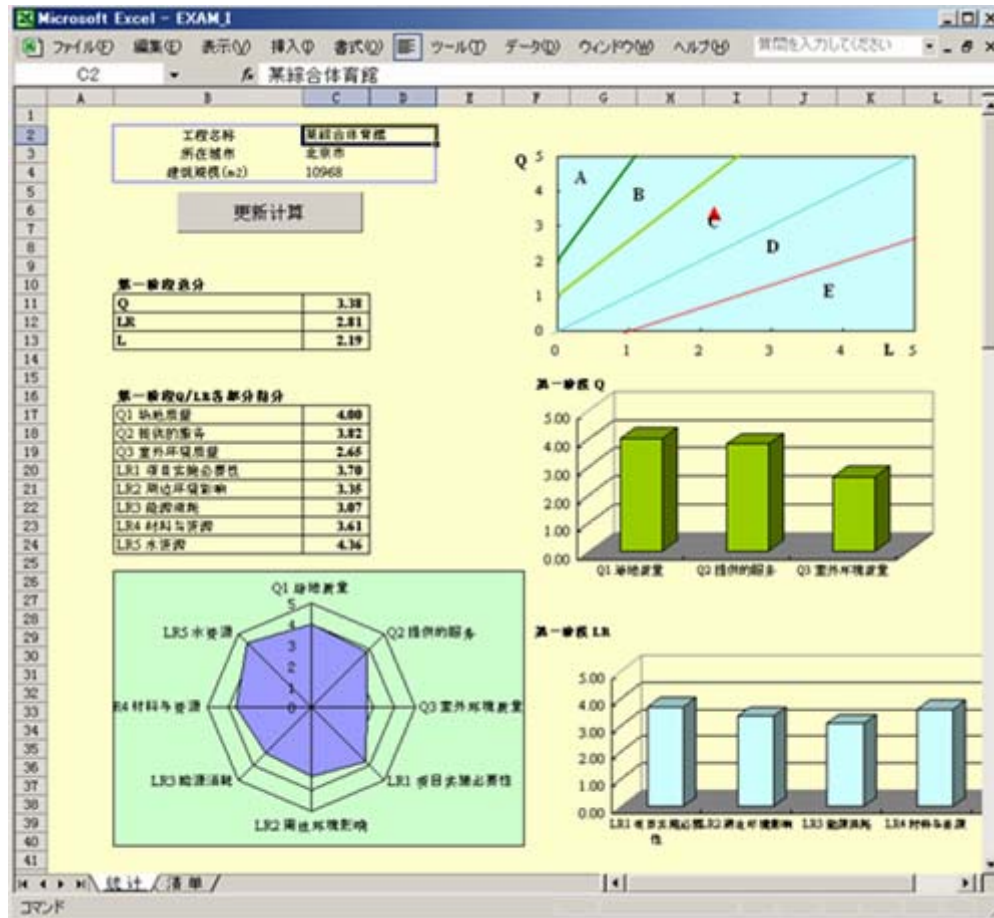
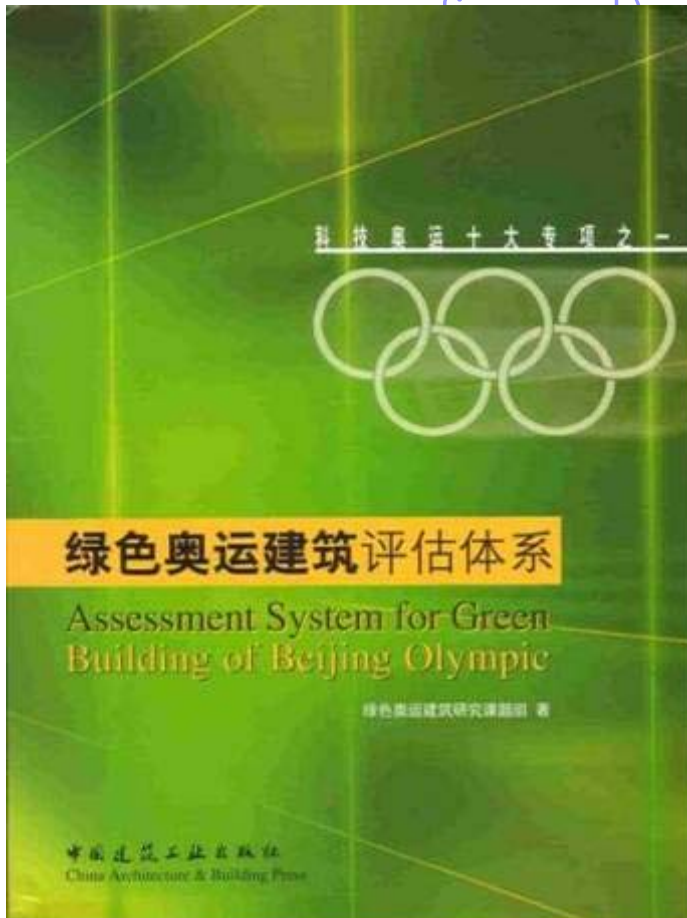


伊香賀俊治 (慶応大)



# GOBAS (China)

(For 2008 Beijing Olympic Facilities, 2003.8)  
(CASBEE was



グリーンオリンピック建築研究チーム著： 清华大学（江教授、秦教授、朱教授ほか）  
+ 北京市持続的発展科学技術促進センター（藤センター長ほか）+ 中国建築科学研究院  
+ 北京市建築設計研究院 + 中国建築材料科学研究院 + 北京市環境保全科学研究院ほか



# Merit of Commissioning

## For Building Owners;

- Building truly match Owner's requirements
- Realize High Quality Products and Maintenance
- Contribution to Facility Management
- Obtain Cost Efficient Building through Lifecycle
- Satisfactory Room Environment
- Added Value to Real-estate
- Reasonable rent
- Satisfaction through Energy Conservation

# Merit of Commissioning

## For Design Professionals:

- Raises Quality of Design
- Clarify Roles and Responsibility of Designers
- Economical Merit
  - Fair amount of fee deserving its quality
  - Reduced Troubles
  - Cost Effective Design
- Raised Fame as Design Professional
- Act as CA based on their experience

# Merit of Commissioning

## For Contractors:

- Clarify Scope of TAB
- Reduce Troubles during Construction and after Occupancy
- Economical Merit
  - Clarified Scope and Responsibility for TAB and Cx-related Works
  - Reduce Risks for Trouble Solution Expense
  - Clearly define Fee for Design Support Works
- Clearly define Acceptance Procedure
- Act as CA based on their experience

# Merit of Commissioning

## For O&M Engineers:

- Earlier Participation to Cox Team Process
- Improved Maintainability
- Improved System Documentation to Operate
- High Quality Accepted Systems through Complete TAB, FPT process
- Acceptability to Instruction and Guidance by CA as Consultant
- Improved Status of O&M assisted by Deepened Knowledge and Improved Working Environment



# World Commissioning History World/Asia

ESL-11-06-11-324



- 1970s Cx Activ. started, USA  
CIBSE Code on Cx
- 1979 ASHRAE Symp. on TAB
- 1986 ASHRAE Symp. On Cx.
- 1988 First SIBSE Code in UK
- 1989 First AHRAE Cx Guide

- 1991 Annex25, BOFD
- 1993 First NCBC held, PEI
- 1995 Annex34, BOFD Demo
- 1996 ASHRAE New Cx Guide
- 1999 BCA (US) established
- 2000 Annex40, HVAC Cx
- 2003 UK Cx Code M issued
- 2005 ASHRAE/NIBS Cx Process  
200X-0  
issued
- 2006 ICFE 2006 (Shenzhen)
- 2006 ICFE 2006 (Shenzhen)

- ## Asia
- 1980s (HK) TAB/Cx Activity started
  - 1987 (J), First introduction of Cx
  - 1991 (J, C) Annex25
  - 1995 (J, HK) Annex34
  - 1997 (J) Cx Activity started
  - 1998 (J) First Cx Guide Draft
  - 2000 (J, HK) Annex40 participation  
(J) First Application of ICFE
  - 2003 (TW) TAB/Cx began to work
  - 2004 (J) BSCA established  
(HK) HKBCxC established
  - 2005 (J) Cx Guideline issued
  - 2006 APCBC 2006 11 (Shenzhen)

## Annex47, Retro-Cx,



Thank you  
for your participation