

Sustainable Building Design + Education

*Dialogue between Policy Makers and Researchers:
Demands and Roles of Sustainable Low Carbon Development Researchers*

**Acharawan Chutarat, Ph.D.
School of Architecture + Design
King Mongkut's University of Technology Thonburi**

18 November 2010

Opinions are personal to author

Keys

- Current situation
- Barriers
- Needs
- Suggestions



Globalization in economy



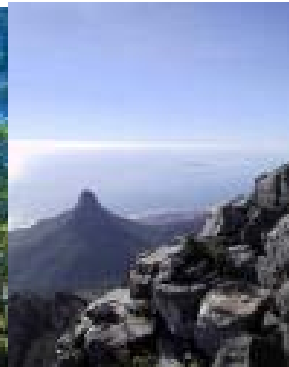
Technology

Changes

People + Society



Environment + Resources



Lifestyle + Consumption



Nutrition & Health Learning Community	
Serving Size: 1 cup (200g)	
Serving Per Container: 2	
Amount Per Serving	
Calories 200	Calories from Fat 110
% Daily Value*	
Total Fat 10g	20%
Saturated Fat 5g	10%
Cholesterol 20mg	40%
Sodium 50mg	10%
Total Crap 10g (10g)	100%
Iron 1g	20%
Fiber 1g	20%
Protein 1g	20%
Carbs 1g	20%
Water 1g	20%
...	...

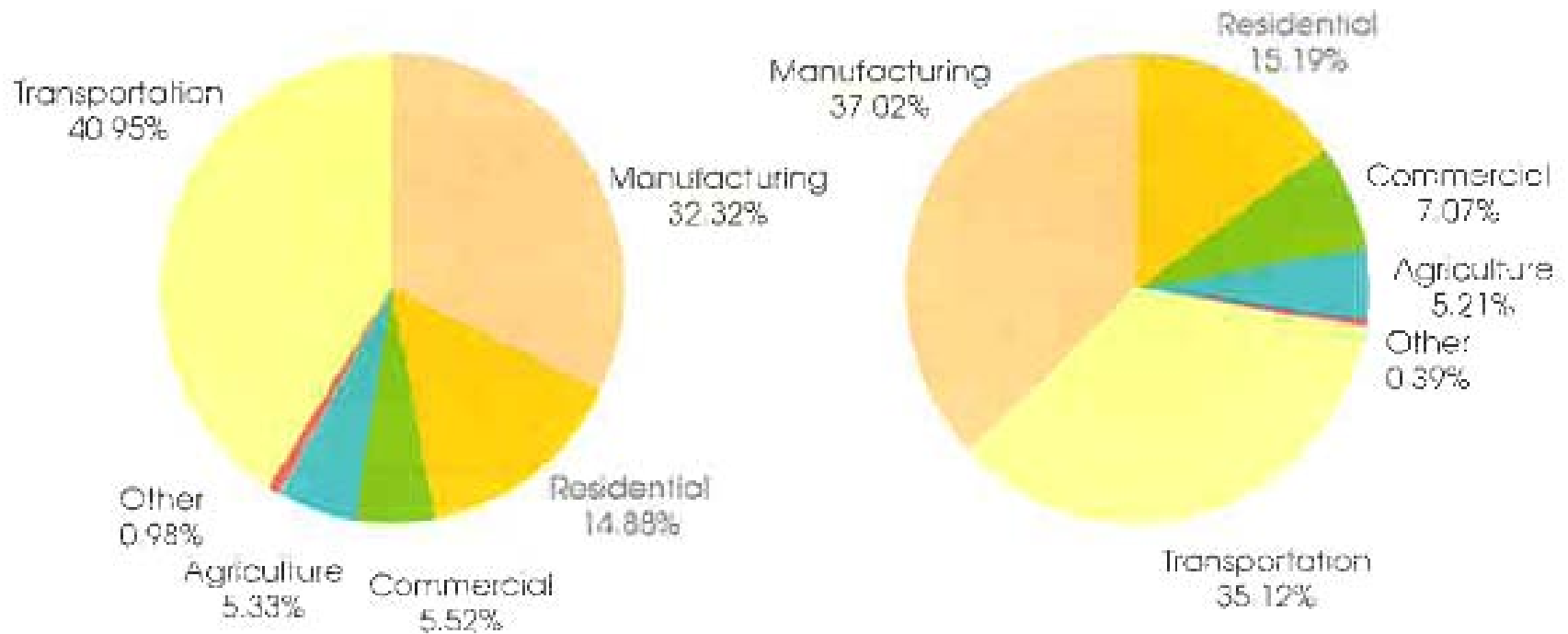
Final Energy Consumption by Sector

1997

49,455 ktoe

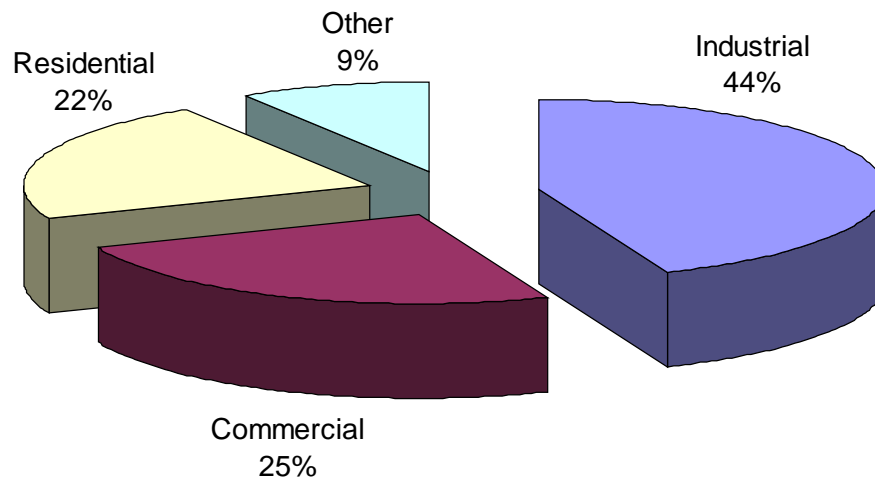
2008

66,284 ktoe



Source: Ministry of Energy

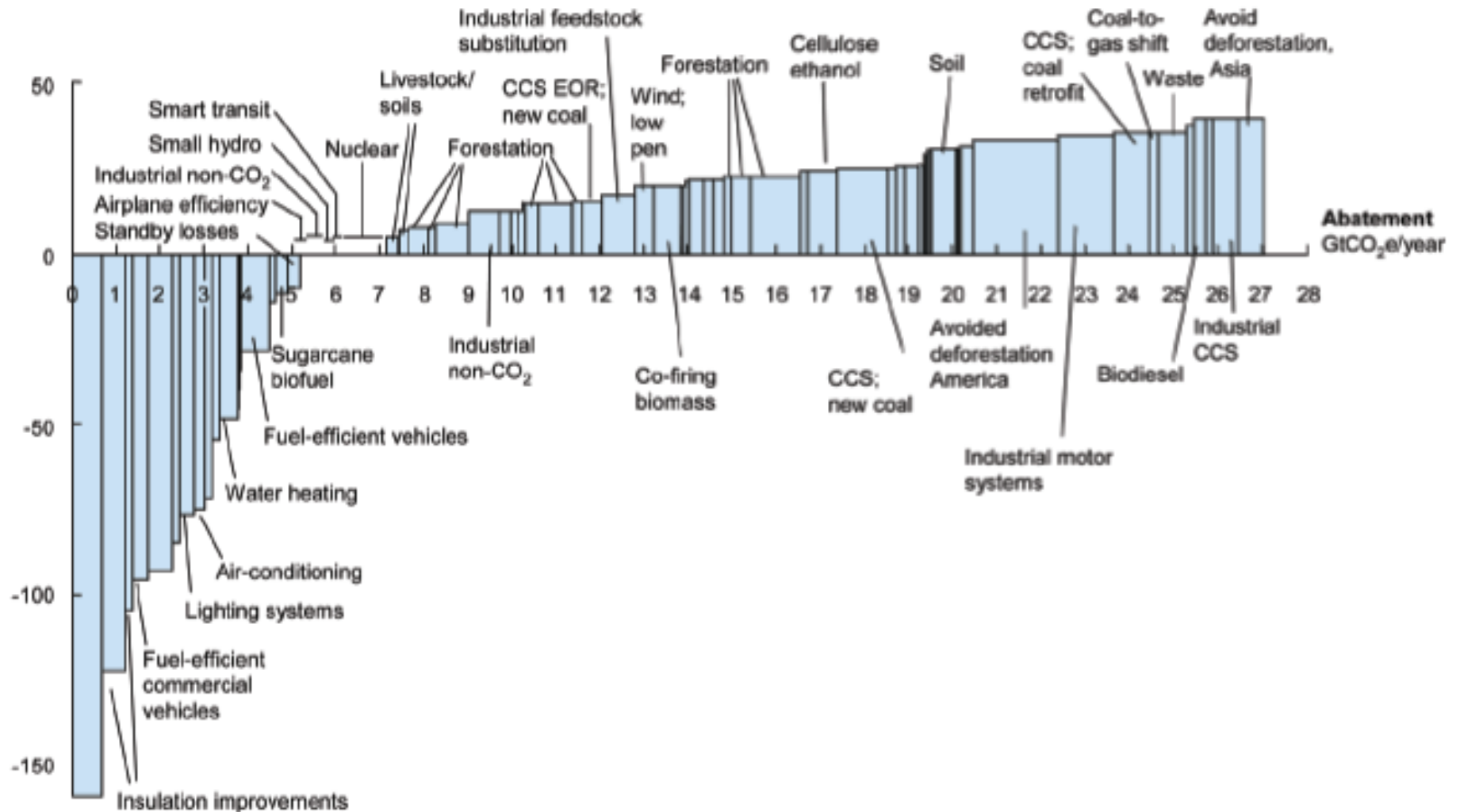
Share of electricity use: Electricity consumption in buildings



Source: Ministry of Energy, 2004

THE COST CURVE PROVIDES A “MAP” OF ABATEMENT OPPORTUNITIES

Cost of abatement, 2030, €/tCO₂e*



* Tons of carbon equivalents.

Source: McKinsey and Vattenfall analysis

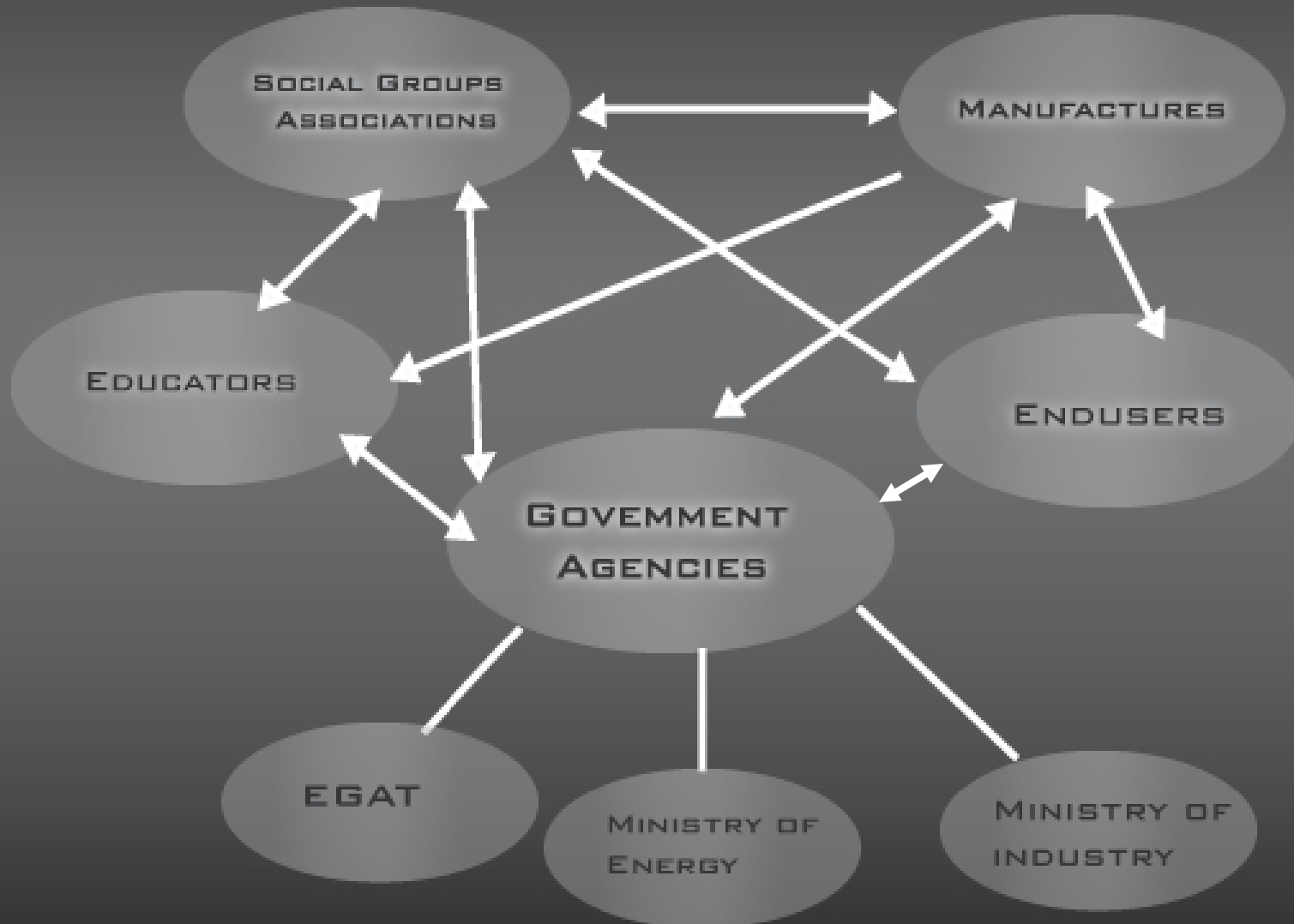
Illusion or Reality

Myths	Realities
<ul style="list-style-type: none">• Abatement opportunities are concentrated in the industry and power sectors• Limited amount of low-cost opportunities in industrialized countries• Abatement opportunities are concentrated in industrialized countries and China• We can only achieve the required abatement through new technology• Addressing GHG emissions will severely strain the global economy	<ul style="list-style-type: none">• Industry and power represent less than half of the total 2030 abatement potential*• Negative cost abatement potential represents 35–45 percent of the total in industrialized countries• Developing world excluding China represents >40 percent of the total 2030 abatement potential*• 70 percent of the total 2030 abatement potential* not dependent on new technology• Reaching 450 ppmv could cost as little as 0.6 percent of GDP if all low-cost opportunities efficiently addressed

* Below €40/tCO₂e.

Source: McKinsey analysis

Stakeholders in EE Building Industry



Policies, Codes and Standards

- Energy policies and standards
- Utility programs
- Appliance standards
- Building energy codes
- Labeling programs
- Codes of practices

Main Barriers to Manufacturers/Suppliers

- Technical staff have inadequate know-how and design capability for EE equipment and products
- Lack of **government supports or incentives** on policy for providing R&D grant, tax, etc.
- Lack of response of stakeholder for **R&D and understanding end users**
- Low market demand on EE products



Main Barriers to Government Agencies

- Lack of awareness of management boards on EE in buildings due to limited capability in getting information.
- Ministry of Energy, of Industry, of Interior and of Finance lack **collaborative comprehensive policies and effective implementation plan** on built environment.
- Lack of comprehensive regulations and code of practice in building system.



Barriers to Government Agencies

- Ministry of Communication, Highway department and Ministry of Interior are responsible for urban, transportation, and buildings but **lack of qualified human resources.**
- Local administration office lack qualified technician for energy management and awareness building.



Barriers to Architectural Education




- Lack of knowledge center
- Lack of effective continuing academics and technical experts on **integrated energy efficient building technology and community or stakeholders.**
- Limited **human resources** in green architecture among professors
- Less of **awareness in the economic importance** of efficient solutions.
- Inadequate laboratories and experimental equipment in the universities.

Barriers to Designers and Engineers

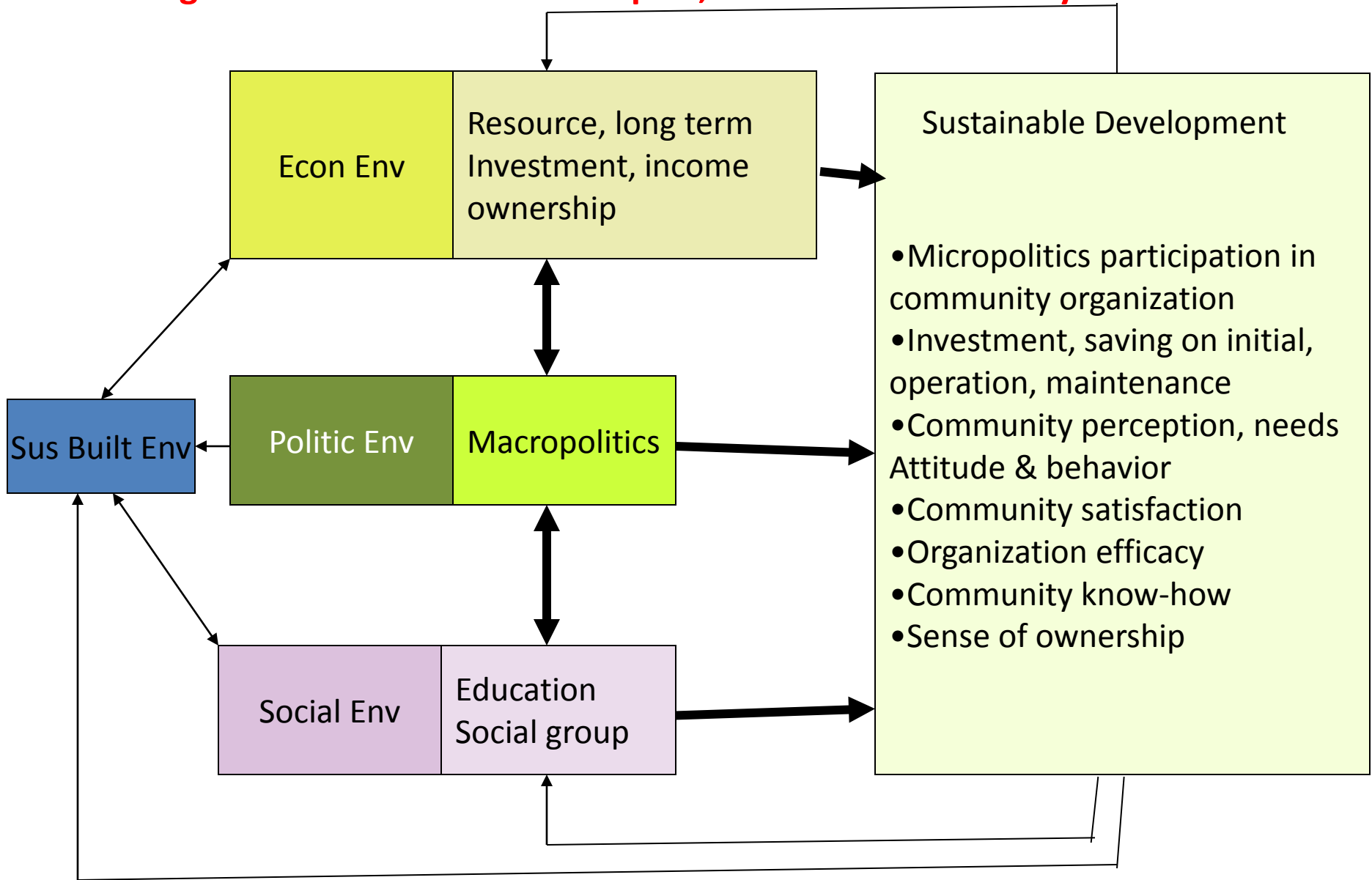
- **Time consuming and limitation** in integrating energy efficient in building or urban planning
- Lack of comprehensive and **user-friendly design tool** and demonstration facilities
- Limitation in access to know-how, information and resources in energy efficient lighting design
- **No incentive to invest time and effort for EE design** and specification



Needs

- Human resource development for different levels
 - Curricular development in design, planning and other discipline with different learning process.
 - Demonstration facilities
 - Enhancement in knowledge and activities in energy efficient design in a sustainable way
 - Government policies—code, regulation, incentives considering **end users decision making processes**
 - **Enhanced linkage and cooperation between academic research and government policies across ASEAN region.**
- 

Things should be seen from complex, interconnected and systemic view



Re-thinking of sustainable education crisis

- Current education is fragmented**
- Need goal based learning with multidiscipline**
- Try to think out of the box and use holistic (global/local life style/history of wisdom) to re-examine the crisis by our soul.**

The United Nations listed six evaluation criteria for eco-city:

- **guided by strategic planning and ecology theories;**
- **industrial products are “green”, promoting closed-loop production processes;**
- **adopting organic agriculture;**
- **residential areas with the standards to improve residents' lifespan;**
- **cultural and historical preservation;**
- **protecting natural resources, integrate the natural environment into city.**

In gl

ate

Asia must begin building blocks for stronger regional bargaining power in the Global Architecture.

Small steps such as:

- 1. Regional Asian Sustainable Built Environment Forum to coordinate views on regulation.**
- 2. Asian Sustainable Building Development Center as virtual research institute with ministries of finance, energy, interior, industry and policy maker participation.**
- 3. Work on regional professional career and educational exchange to develop current issues in practices such as low carbon tool, guideline and its impact**
- 4. Push towards common voice on global platform**

Architectural Education For Sustainability



Towards A Better Quality of Learning ...

Education

- Holistic program approach/team learning
- Tool
- International relation
- Upgrade educators

Activities

- Professional/community involvement
- Exchange/workshop
- National-international benchmark

PR Awareness

- local community
- Nation-level
- International position
- General public across segments + schools

SoA+D

Conclusion

- **Thailand and Asia are facing a structural rebalancing in Global economy and community**
- **We have to work together to escape from a trap**
- **Such policies require quick and interactive respond**
- **Current theory, practice and education do not give enough guidance.**
- **Next step is to re-design system and education to Asian needs.**

THANK YOU