



What engineers can do in combating global warming

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The next twenty years are most critical

- 1. Try to arrest the runaway increase of carbon dioxide. If the world does not do anything now and let business as usual, then by 2050, there will be so much climate change that the situation would be irreversible. (IEA study: Energy Technology Perspectives 2006: Scenarios and Strategies to 2050)
- 2. The next twenty years is critical. We need to start our effort to reduce the growth rate in carbon dioxide emission as a first step.

Ways to reduce emission

- Use a different way of energy generation rather than fossil fuel: e.g. by 2030, contributions of reduction from: Renewable energy (12%), nuclear (10%)
- Improve the fuel to energy conversion of fossil fuel.
- Improve the loss of energy transmission to end use:
- Improve energy efficiency at end-use: potential of contributing up to 65% of the projected growth reduction
- CO₂ sequestration (probably not mature enough to be significant)

What is the role of the engineer in this context?

- ☞ To deploy technologies and engineering practices to help clients and to achieve energy efficiency and carbon reduction.
 - The technologies to achieve 20% energy efficiency are available.
 - But the engineers' work is hampered by a lot of institutional hurdles.
 - Hence the engineer also has a role to convince and persuade the decision makers (the people holding the purse string) and other professionals.

Institutional hurdles (1)

- Introducing new technologies and changes always come across resistance.
- Examples:
 - a) Conventional way of evaluating cost-effectiveness and return on investment.
(Emerging technologies do not have the scale to lower cost to compete with conventional equipment. Also, a long payback period is not readily accepted by project owners)

Institutional hurdles (2)

- Examples (cont.)
- (b) Conventional specification (lack of confidence to specify something creative and innovative)
- (c) resistance to accept change in our daily life (e.g. many people still has resistance to CFL and LED. They prefer the tungsten halogen lamps because of the colour temperature, despite engineers have advised many times the disadvantages of the latter.)

Summary of Institutional barriers that hinder changes and innovation


- ☛ Traditions, established practices and designs
- ☛ Market structure and conditions may not encourage adoption of innovative products
- ☛ Habits

Can we overcome institutional hurdles? (1)

- ☛ This is the role and vision of everybody. Engineers cannot do it alone.
- ☛ The financial support from government in energy and carbon audit and in retrofit improvements will go a long way to address the first hurdle.
- ☛ The Mandatory Building Energy Code is a way to help alleviate the second hurdle.

Can we overcome institutional hurdles? (2)

- But above all, the most difficult hurdle is the third one. We need **everybody** to embrace the notion that we should prepare to change and/or to make some sacrifices of the present comfort and change to some new schemes; not just lip service.
- After all, we cannot use the old paradigm to deal with something we have not faced before. Engineers could help bring about the new vision and new paradigm with their expertise and professional knowledge, but we need the support of everybody in the community.



Let's work together in
overcoming these hurdles.

Thank you.