From Climate Change to Sustainable Society

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Recognition of the limit of the Earth

- Finite character of the Earth
- Limits to Growth
- Spaceship Earth
Under a limited environment,

- One possible way of sustainable movement is
  - A cycle or
  - an oscillation

In our environment, many cycles

- Energy Cycle
- Water Cycle
- Carbon Cycle
- Nitrogen Cycle
- Materials Cycle etc.
- Many Cycles!
When CO₂ is emitted, O₂ is decreasing!

Circulation is critical for sustainability!

Radiation Balance (Energy Flow)

Energy Cycle cannot be separated from Water Cycle!
Global Warming

- Perturbation to the Earth Radiation Budget
- As a result, our climate is changed!

Each of the last three decades has been successively warmer at the Earth’s surface than any preceding decade since 1850.

In the Northern Hemisphere, 1983–2012 was likely the warmest 30-year period of the last 1400 years (medium confidence).
Global surface temperature change for the end of the 21st century is likely to exceed 1.5° C relative to 1850–1900 for all scenarios except RCP2.6.

[...], a nearly ice-free Arctic Ocean in September before mid-century is likely for RCP8.5 (medium confidence).
Limiting climate change will require substantial and sustained reductions of greenhouse gas emissions.

Budget for the $2^\circ$ C target: 790 GtC

$CO_2$ emitted until 2011: $-515$ GtC

Remaining emissions: 275 GtC

$CO_2$ emissions 2012: 9.7 GtC/yr

RCP2.6

$CO_{2eq} = 475$ ppm

RCP8.5

$CO_{2eq} = 1313$ ppm

We have a choice.
Now is a time to take actions!

- Generally it is acceptable, but the details are not!
- Many stakeholders
- There are many excuses for not-taking actions
- Different values
- Diverse interests
- Consensus Building

Win-win relationship

- Vision of the Future Society
- Low Carbon Society
- Material Cycle Society
- Nature-friendly Society
- Integration of Three Society + Safety
Linkages among three systems

Global system
- Climate system
- Energy and Resources
- Ecosystem

Social system
- Politics
- Economy
- Industry
- Technology

Human system
- Security/Safety
- Lifestyle
- Health
- Norms and values

Low-Carbon Society

Global warming

Complex Problem

Mass production, consumption, destruction

Resource-circulating society

Environmental Risk Management

infectious diseases
natural disaster

Liberté, Egalité et Fraternité
Premier of Malaysia provided permission in the 13th IRDA Steering Committee to start the Iskandar Low Carbon Society planning (December 11th, 2012)

“Development of Low Carbon Society Scenarios for Asian Regions “In the case of “Iskandar Malaysia”

Japanese experience on Low Carbon Scenarios & Roadmaps +
Malaysian challenge on Implementation of Low Carbon Visions

Eco-City Monitoring and Modelling System in Asia

Energy and Environmental Monitoring for Urban Sectors

Energy and Env. Information Management

Smart Eco-industrial complex

Local energy supply and demand

High value substitutive

Local symbiosis

Power plant

Steel

Chemical

Urban and Regional symbiosis
BaU scenario in Fukushima Shinchi town in 2030

Energy Network Scenario in Fukushima Shinchi Town in 2030
Monitoring and Modelling System for Future Scenario

- District heating system
- Local Energy system
- Smart control

Commonness and Diversity

- Globalization and local/regional character
- Value
- Quality of life
- Tolerance and mutual respect
We need

- Sharing knowledge and information
- Modeling is critical
- Accessibility and accountability
- Again, Tolerance

Thank you!