Global Focus on Knowledge Lecture Series

Energy and the Earth

Governance of Energy and Environmental Problems

3.International Political Processes Among Global Warming and Energy Security

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Issues of Science and Technology Governance（1）

Uncertainty

- There is always some uncertainty in science which needs risk assessment—How the society judges certain uncertainty is questioned.

"Precautionary Principle"：An attitude to take preventive measures such as regulations even if risks are uncertain, since there is a possibility that something very harmful might happen.

"No Regret Policy"： When what would happen is uncertain, an attitude not to prepare for envisioned emergencies, but take only measures which would be meaningful even when nothing happened.

Issues of Science and Technology Governance (2)
Multiple Aspects of Benefits from Technology

- Benefits of technology change as its purpose in the society changes. For example, nuclear power generation technology was recognized to have benefits for energy supply, but after global warming was recognized as a social problem, additive benefit not to emit carbon dioxide which is a causative substance for warming was also recognized. On the other hand, risk of emitting carbon dioxide was highlighted for thermal power generation using coal in a social context of global warming, but as oil prices rose and energy security gained attention for increase, coal was reconsidered to be distributed relatively all over the world and thus has a benefit for energy security.

Issues of Science and Technology Governance（3）

Risk Trade-off

- Risk trade-off is an effort made for reducing certain risk that end up in increasing risk inversely.
- Ex：A car lightened to improve fuel efficiency is vulnerable to collision; early replacements of CFC reduced damages to the ozone layer, but some of them promoted global warming；methyl bromide used for fumigant to lower risks in food safety had a risk for destroying the ozone layer.
- Wind-power generation：Trade-off between global warming risk or energy security risk and risks for killing birds, generating landscape noise.
- Bio fuel：Trade-off between energy security risk or global warming risk (?) and food security risk in developing countries

Theoretical Viewpoints to Social Induction of Technologies

- Regulations and Innovation

（1）Porter Hypothesis（environmental regulations→competitive force）：Japanese cars－possibility of win-win by technology innovation

（2）Technology Forcing：environmental regulations→technology development：cars in 1970s

- Focus on Processes

（1）Multi-tiered steps：regulation→technology development（？）→competitive force（？）

（2）Focus on interactions among various bodies－government, company, NGO …

（3）Focus on interactions between government policies and company strategies change in company's strategy（CNG：Sagawa, Toyota: hybrid)

（4）PEN（Public Entrepreneurship Networks）

Public functions of non-government bodies（NGO etc,） electric tramway

Step-by-step development under uncertainty－importance of experiments car sharing

- Induction processes：importance of framing to show what that technology is for－diachronic changes：electric tramway（differences in Okayama and Takaoka），limits in biomass－Only taking environmental measures is not enough
- Lock-in and release－relationship between technology and system：importance of infrastructure（CNG, car sharing←→hybrid）－importance of time-axis needed for investment；importance of significant outsider(wind power) and significant boundary actors (eco-cute)

Political Origin of Global Environment Problems1

- 1988：Turning point of global environment problems－IPCC：Intergovernmental Panel on Climate Change was established.

  “window of opportunity”：Uncertain scientific arguments have been made continuously.
- End of the Cold War－Dec., 1987：INF abolition
- Thatcher who was a neocon snatched this－Political use of environment problems
- March 1989：London conference on ozone layer protection
- UN congress in 1988 fall: Foreign Minister Shevardnadze switched to security concept

Political Origin of Global Environment Problems 2

- New expression for North-South issue－development and environment：”sustainable development”－climate change convention “Common but different responsibilities”
- Distribution of macro resources（use of carbon dioxide）－a North-South issue
- ODA－Rio Summit：0.7% in comparison to ODA GNP is the target cf. enhancement of GEF（global environment facilities）－2 billion dollars in 3 years
- Recent years：responses to China and India, reason for re-reinforcement of ODA

Ozone Layer Protection Regime1

- Research for supersonic airplane as a chance：unintended discovery
- 1975：UNEP offered money to WMO's research the effect of CFCs (chloro-fluoro carbon) to ozone layer destruction .
- 1977：UNEP experts conference adopted " The World Project on Ozone Layer"

  International action to regulate use of CFC was proposed as a choice, but even the most enthusiastic supporters did not feel the urgency of the problem.
- The late 70s to the early 80s-Scientific assessment of predicted destruction changed continuously.
- USA（30% of the world's production）－partly leading countries＋ Canada, Sweden

  but EC（45%）－refused to federate
- 1985：Vienna Convention for the Protection of the Ozone Layer－ for monitoring, research, and exchange of information

  No specific duty was obliged.

Ozone Layer Protection Regime2

- 1987：the Montreal Protocol－Promised to reduce CFC production to 50% of the level in 1986 before 1999

  Later, new evidence was found. ＝Regime enhancement was promoted by discovery of ozone hole

  cf. Unpredictable atmosphere model which promoted preventive actions（Litfin）
- 1989 Conference of the countries which adopted the Helsinki Declaration：Dramatic change of refusing federation－EC：promised to stop production of CFC before2000
- 1990 June：Conference of the countries which adopted the London Declaration－London Agreement

  Production of CFCs was to stop before 2000.

  Methyl chloroform was to be eliminated in 5 years.

  Hydro-chloro-fluoro carbon whose damage is small but expected to increase rapidly in the future were not a subject of the regulation.
- 1992：Annual meeting at Copenhagen－Agreement on regime enhancement

  Abortion of CFCs was accelerated 4 years

  HCFCs became the object of the regulation
- 1993：EC Committee－Proposed to stop HCFCS use before 2015,

  but the USA opposed to this. －USA invested largely to HCFC technology as a barter for CFCs－ USA insisted that fast elimination of bromomethane was more important.
- 1993：Conference of the countries which adopted the Bangkok Declaration－Bromomethane became the object of the regulation（Use for fumigation is excluded）

Ozone Layer Protection Regime 3

- Financial Measures

  “Multilateral fund for conducting the Montreal Protocol” was established at conference of the countries which adopted the London Declaration in 1990

  A support for developing countries to switch to alternative substances for CFCs
- Short Summary：①Rapid regime enhancement based on certain scientific definiteness for relatively narrow range,②The USA led the regime to a certain extent ③Financial measures could be used.

Global Warming Prevention Regime1

- Features
  archetype of global public goods issues（possibility of free ride）
  scientific uncertainty－complexity（impacts of sea, clouds, aerosol)
  Important energy for national economy is the object.－politically difficult
- The problem was found in 1985－acceleration to 6 years
  UNEP, WMO：the Villach Conference in Austria, 1985
  Global warming might be a serious problem in the future
  1986：reports by WMO and NASA
  Climate change is proceeding rapidly.
- 1988 summer was extraordinarily hot. －Political factor to promote preventive actions？
  Attracted attention from media, Congress, and the US presidential election.
- UNEP,WMO：established “Intergovernmental Panel on Climate Change (IPCC)”
  intermediate character：A network of scientist which also consider inter-governmental and regional balances
  August 1990: The final report from working group
  That global warming is a serious threat was re-recognized.

Global Warming Prevention Regime 2

- Making a treaty was supported at1989 G7 Summit
- Start of negotiations：February,1991 by ”INC：Intergovernmental Negotiating Committee” established by UN general assembly
- EC：decided to reduce its CO2 emissions to the level in 1990 before 2000. Failed in persuading the USA.
- 1992：The Climate Change Framework Convention was concluded at the Rio Earth Summit

  general convention－remains scientific uncertainty－difficulty of realization

  rapid regime compared to the Law of the Sea

  The USA basically refused.
- 1997 COP3 the Kyoto Protocol：regulation of emissions in advanced countries（the USA signed at last, but did not ratify), emissions trading・CDM, What are responsibilities of developing countries？
- 2007 COP13：Bali Roadmap－issues：USA, China, India and developing countries

Global Warming Prevention Regime 3

- Financial measures：Global Environment Facility（GEF）

  1991：Established as a experimental project for 3 years to support purposes on the Earth environment (climate changes, ozone layer, biodiversity, international water area)

  size：1.2 billion dollars in 3 years　cf. Small, compared to the demand of 60 billion dollars in Agenda 21

  organization：The World Bank is in practical management, UNEP and UNDP offer technological and scientific advice（possibility of the World Bank forcing businesses which must be mainstreamed）

  G77＋NGO insisted on a system based on 1 vote from 1 country (freedom from the World Bank)

  1992：For climate change convention and biodiversity convention, GEF was adopted to be a “temporal” fund mechanism on a condition that GEF maintains “fair and balanced representation” and remain to be “democratic.”

- 1994：Agreement on reform

  Composition of administration board：16 developing countries, 14 supporting countries, 2 former Soviet Union countries and East Europe

  management：Final approval authority of all the project was determined to be given to the CEO of GEF who does not work for the World Bank, projects were to be discussed by proposal of 4 chairmen, and they will be turned down if there are more than 40% disapproval from committee members.

- object：incremental cost－problem of definition
- Emissions trading：The USA insisted on this at first, but EU insisted on environmental tax→Later, the system was established in EU.(Tax is managed by each country, benefit to business chance by emissions trading）
- Timing：importance of policy matched to investment cycle in electric power plant

Comparison of Ozone Layer Protection and Global Warming Prevention

- Common terms

①conduct of preventive actions（Preventive actions were tried before something happens.）

②A certain support for developing countries and responsibilities were a set, and the concept of incremental cost was used to identify how much support was given.

- Differences

①Number and range of players participated in regime creation and management（Production of ozone layer destructing substances were limited to few advanced countries, and companies which produced these substances were few, but various players throughout the world are responsible for climate change as sources of warming gas emissions）

②Degree of economic impact（Size of investment ：Years needed to call-in equipment that uses ozone layer destroying substances (such as refrigerators) are few, but in case of global warming, it takes several decades to withdraw investment for heat power plants using coal）

Energy Security 1

During War : International Cartel — Achnacarry agreement

- Conclusion : 1928
- Participants : Big-3 (Standard (New Jersey), Royal Dutch Shell, Anglo Persian) +4 (Standard California, Texaco, Gulf, Standard New York)
- Feature : international regulation at private level
- Purposes :
  - Correction of cutthroat competition
  - Prevention of overlapping facilities
  - Settlement of sales share of each company

Energy Security 2
Responses of Oil-Producing Countries：
OPEC

- Background
  - Nationalization of Anglo-Iranian Oil Company（1951-54）
  - Nationalization of Suez Canal（1956）
  - Majors brought posted price down（the early1960s）：Discovery of large oil mine continued.
- Establishment：1960
- Purposes
  - Control and unification of oil policies in joining countries
  - Stabilization of prices in international oil market
  - Creating constant income for producing countries' benefit, efficient, economic and stable supply of oil to consuming countries, creating fair payback of investments to oil industries
- Decisions
  - Nationalization of foreign oil companies' business interest
  - After 1982, conduct of production control policy based on production framework of each country
- Results
  - Performance in 1960s was not so good
  - 1970s－impact of the 1st oil shock
  - **Set posted price**（sales price of government）、induction of "Price Band System"

Market Dominance by OPEC

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Energy Security 3

Responses of Consuming Countries：IEA

- Background
  - By the proposal from Henry Kissinger, the U.S National Security Advisor, after the 1st oil shock, established as the agency in OECD
- Establishment：1974
- Conditions for participation
  - OECD member countries（30 countries now）which satisfy stock standard （stock for 90 days of pure import amount per day in last year)
- Purpose
  - Establishment of energy security in member countries
  - Establishment of long-term stable energy needs structure
- Decisions
  - Preparation of countermeasures for emergency cases such as exhaust of oil supply, collection and analysis of oil market information, energy saving to decrease dependence on oil imports, development and promotion of substitute energy, cooperation with non-member nations
  - Collaborative use of stock oil for stabilizing market and urgent oil distributions in cases of emergency is to be considered and conducted.

Energy Security4
Natural Gas—Pipeline Problem

Ratio of natural gas trade in the world

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Energy Security Issues 5
Biofuels

- Emphasis on energy security in USA－
  setting target for biofuels induction
- Possibility of risk trade-off with food supply
- Inflation of food prices as a phenomenon
- Possibility of win-win by technological innovation
- Inter-sector cooperation in technological innovation and production- energy department and agriculture department

Worldwide Biofuels Production

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Biofuels Production Worldwide by Country

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Transition and Trend of Food Prices

Corn（Chicago Board of Trade)

Transition and Trend of Food Prices

Wheat（Chicago Board of Trade)

Transition and Trend of Food Prices

Soybeans（Chicago Board of Trade)

Examples of Policies by Governments of Major Countries: USA

1. Federal support
   - Federal tax deduction induced from energy tax law in 1978
     - Bioethanol $0.135/L (2005-)
     - Biodiesel $0.13-0.26/L
   - Least induction duties
     - Uses more than 28 billion L until 2012
     - Uses more than 38 billion L cellulose-type biofuels before 2015
   - Support for producers
     - 2003-2006 0.15 billion dollars per year
2. Induction and production support in each state
     - Proportion of ethanol, induction of own cars

Examples of Policies by Governments of Major Countries：EU

1. Policies to create needs for biofuels
   - Setting target by biofuels commission
     - Proposed to set the minimum standard percentage of biofuels in 2020 to 10%
   - Tax imposition incentive
     - Almost all the countries in EU induced tax deduction(or tax return)
2. Support from Common Agricultural Policy（CAP）
   - Support by market and price policies
     - Cultivation of energy crops at lands obliged to be fallow became possible
     - Financial incentive of 45 euro per 1ha was decided to be paid in all EU for a land whose area is smaller than 2 million ha.
3. Support by regional policies of EU
   - Incentives for farmers, farm machines and equipment purchases, investment for installation
4. Research and development efforts by EU level

Related International Organizations and Their Responsibilities

International Biofuels Forum(IBF)

- Inaugurated by Brazil, USA, China, India, South Africa and EU in March, 2007
- Aims for promotion of biofuels
- Holds regular meetings as a preparation for international conference on biofuels to be held in Brazil, 2008.

International Bioenergy Platform (IBEP)

- FAO planned in 2006.
- Points out that impact of bioenergy on working poor, food security, farming village development is not known enough, and is trying to cure this defect.

Global Bioenergy Partnership(GBEP)

- Included in 2005 Gleneagles Action Plan by G8+5
- Support induction of biofuels and wider, cost-effective biomass into developing countries where use of biomass is growing popular.