

Oct. 5, 2011
JST-GRIPS Symposium on
Responsibility and Role of Scientists in Society

Lessons on Responsibility and Role of Scientists in Society from "The Great East Japan Earthquake,"

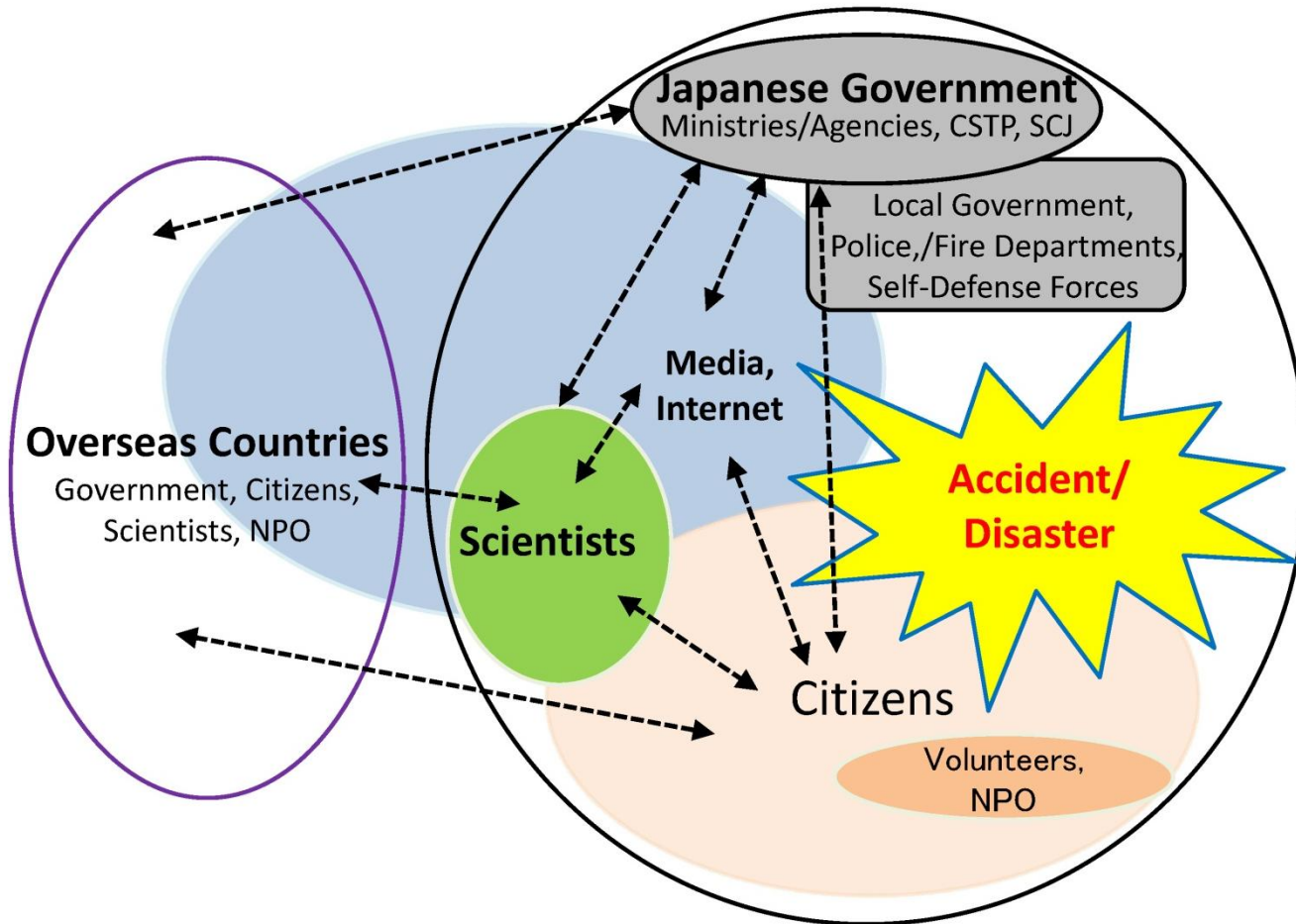
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- **Relationship of scientists between government, media and society after the Fukushima nuclear accident**
- **Need for the code of conduct for scientists as an advisor for the society**
- **Making trustworthy scientific advice for the society**

Relationship of scientists between government, media and society after the Fukushima nuclear accident (1)



- Each government sector's responsibility and role, the chain of command, and their legal basis at contingency ?

Relationship of scientists between government, media and society after the Fukushima nuclear accident (2)

- Legally and ethically ambiguous relationship between people in charge of accident and scientists
 - Has the government employed scientific advice when taking a countermeasure to contain the accident?
 - How scientists should act when summoned by the government and policy makers ?
 - How scientists act and speak in the mass media?
- Lack of formation of agreed (coherent) voice of scientists
 - Details of developing accident and plant facilities were not disclosed nor supplied to scientists
 - How promptly the Science Council of Japan and other academic/technical societies sent out messages to the society? (Ex. accident development, radioactive contamination, allowable level of radioactive exposure)
 - General rule of release of scientific advice? Review process and conflicting views?
- Insufficient report to the global society, international academia, and scientists abroad
 - Accident information, collaboration to make countermeasures; concern with the credibility of Japan



Action of the Science Council of Japan

- Emergency Meeting and Urgent Report, “What we can do now?” (March 18, 21)
- Great East Japan Earthquake Task Force: seven Urgent Reports (March 25 – August 3)
- Report to the Foreign Academies from Science Council of Japan on the Fukushima Daiichi Nuclear Power Plant Accident (May 2)
- Dispatch of information and recommendation on protection against radiation according to ICRP
- Message of SCJ Steering Committee, Reconstruction from the Great East Japan Earthquake and the Responsibility of SCJ” (Sep. 22)

Lack of preparedness of science community against contingency!

Message of President of the SCJ on Sep. 30: “Our action to the government and the society was not sufficient”

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The SCJ's Charter and Code of Conduct for Scientists

- The Charter describes the vision and basic missions that the members of SCJ should share (April 8, 2008)

. . . scientists. . . are those who should contribute to the public well-being by finding new knowledge and developing advanced technologies, and also to the well-balanced, peaceful development of global human society and the environment . . .

- The Code of Conduct is the principle that assures all scientists' responsible and ethical conduct in research activities (Oct, 3, 2006)

. . . Therefore, research activities based on scientific freedom and the subjective judgment of scientists only gain social recognition once they are premised upon public trust and the mandate of the people. . . . Ethics for scientists also constitute a basic framework whereby society can demonstrate its understanding of science and seek dialog with science.

Scientists' Advice Called for by Government and Society

- “Science for Society” as a basic concept of the modern science
- Proper **scheme** needed for establishing the **mutual understanding** on the significance of scientific advice between scientists and society/politics at the time of **emergency** and also in peace time
- Pieces of advice, which are indispensable for making the government's science and technology policy, should be assured to be **independent** and **non-partisan**
- Formation of coherent voices of scientists
 - Accountability of scientists to the society (independence, openness, promptness)

Making Scientific Advice Independent, Balanced and Legitimate

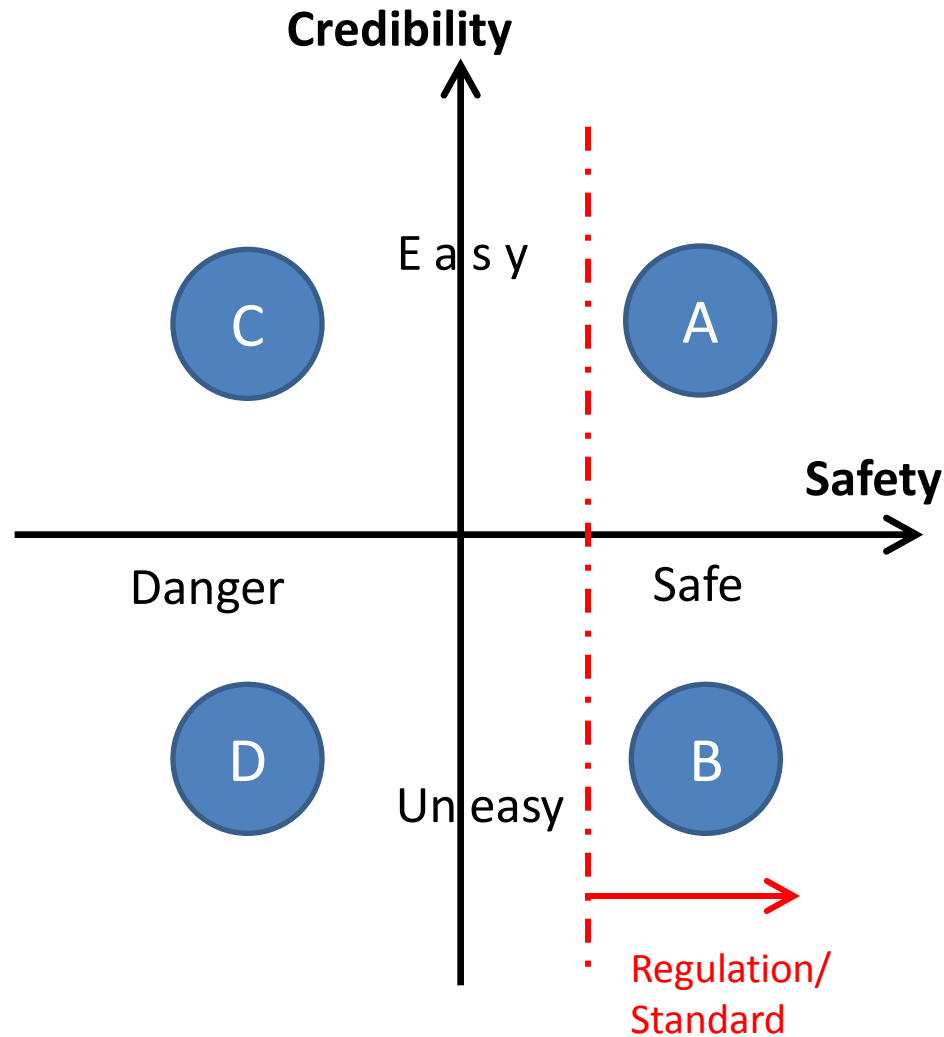
- From **assumption** to **contract with society** assuring independence, balance and legitimacy of science
 - Science as a asset of society
- **Science community** should establish a **code of conduct** in its relationship with society, government and media, and also **rules** for concrete actions
 - rules for releasing scientific views, peer–review (incl. external review), and additional views

Cf. Is science really objective? Merit and demerit of authority? (Torahiko Terada)
- **Government** should recognize the role of scientists as a advisor and prepare a framework for making scientific advice useful in a healthy manner
- Continuous dialog with **mass media** for a better way of dispatching scientific advice to society
- Internationally equivalent code of conduct and rules for ethical actions by working together with international scientific network

Toward Better Risk Communication

- Responsibility of scientists for account to society (reasoning for scientific judgment more important)
 - Credibility, openness, promptness, plain explanation etc.
- Risk communication in conformity with the code of conduct, the worst and the easiest, safety assurance, action for minimum damage and loss
 - How to judge and explain matters of large uncertainty
- Exploitation of scientific knowledge for countermeasures against developing accidents and disasters
 - Predictive services of accidents: atmospheric/oceanic diffusion of radioactive materials, uncertainty in prediction, prevention of panic
- Assessment and judgment of an accident of extremely low possibility, but causing great damage

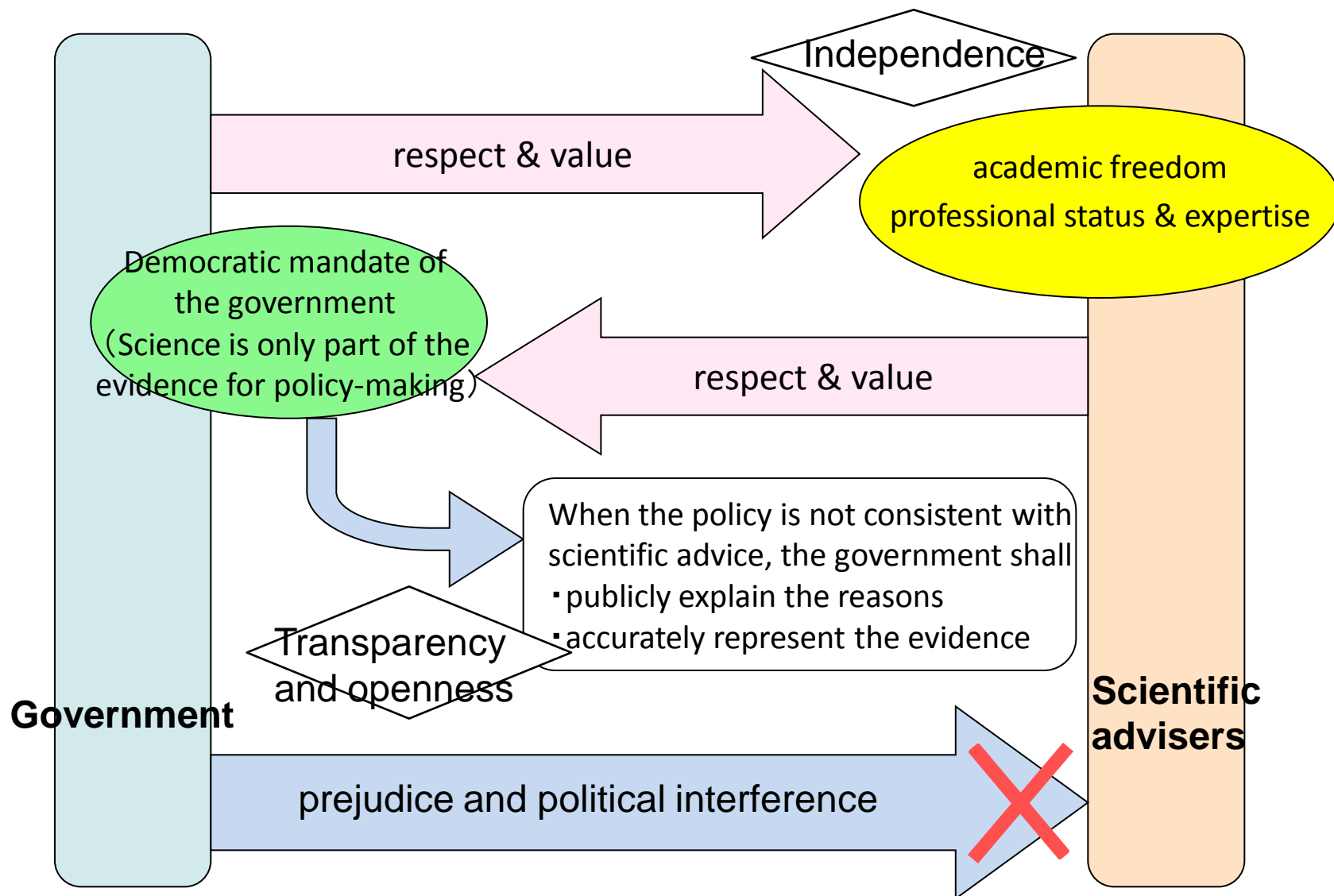
“Safety and Ease of Mind” Hinging on Scientist’s Credibility



- Human’s ease of mind on artifacts depends on the degree of confidence on scientists!

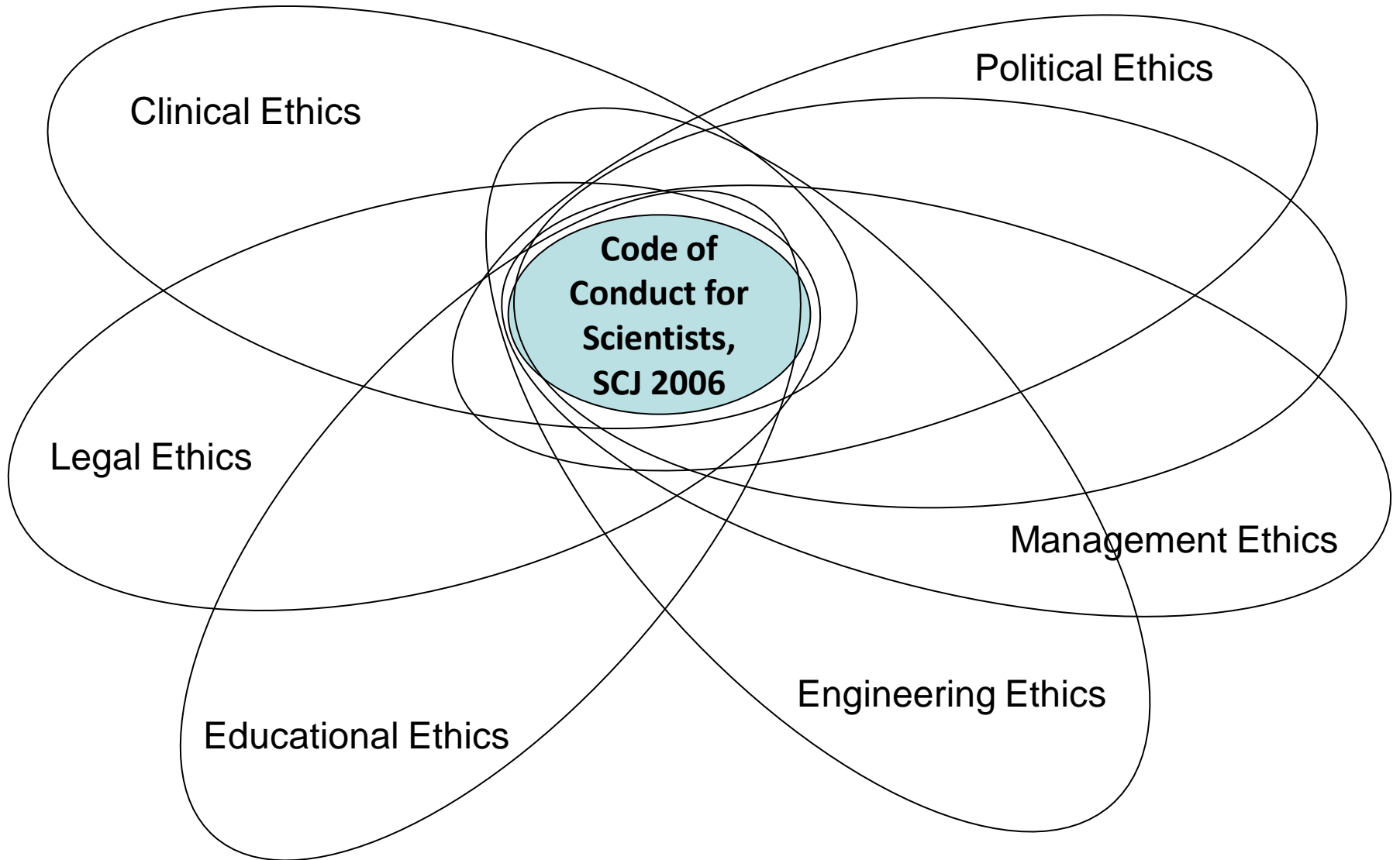
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UK Department of Business, Innovation, and Skills, “Principles of Scientific Advice to Government” (March 24, 2010).



“Scientific advisers should respect the democratic mandate of the Government to take decisions based on a wide range of factors and recognize that science is only part of the evidence that Government must consider in developing policy.” (by Arimoto, JST)

Linkage between Scientific and Professional Codes of Ethics



Scientific Advice for Policy Making

- Science convened more often for policy making; scientists, engineers, managers, and NGOs are involved in many committees and advisory boards at Ministries and Agencies
- What are the responsibility and roles of scientists?
 - Should not mix scientific knowledge and thought/belief/feeling
Scientists ≠ Policy Makers
 - Distinguish the matters for which scientific analysis/design is/isn't possible
 - Add information on the reliability and uncertainty of scientific knowledge

Policy-relevant vs. Policy-prescriptive

Ex. IPCC

Scientific Measures Needed for Energy Policy Making

Supply Stability	Environment (Safety)	Economy
<ul style="list-style-type: none"> • Reserves of resources (country distribution), reserve-production ratio (fossil and nuclear fuels) • Supply stability (overseas dependency, independent development of resources) • Fuel price stability in international market • Temporal fluctuations (hourly, weekly and seasonal; natural energy) • Plant operation rate (inspection/maintenance periods) • Traceability for load fluctuations • Energy supply at emergency and/or isolated areas 	<ul style="list-style-type: none"> • Atmospheric pollutions (NO_x, SO_x, soot, dust), Ozone layer destruction (chlorofluorocarbon), thermal discharge • Climate change and fluctuation (green-house effect gases) • Radioactive wastes, radioactive pollution (nuclear power plant) • Compatibility with food production, nutrient enrichment (N, P; biomass) • Impact on ecosystem and biodiversity 	<ul style="list-style-type: none"> • LCA, energy profit ratio, energy payback years • Fuels prices (cost price, conversion/transportation/storage costs), materials price, electricity price • Business stability against fluctuating fuel prices • Costs for R&D, plant construction, manufacturing, site, environmental measures • Time periods for environmental assessment, construction and approval • Decommission and waste processing • Prevention of disaster and terrorism, costs for recovery and compensation for disaster • Impact on economy and employment

Scientific Network for Making Timely Advice

- Tree-structured network of scientists and professionals for making an urgent message under the Cabinet Office and the SCJ
- Different branch network for each of the classified major accidents and disasters (not classified and grouped depending on academic disciplines, but convened according to the necessity)
 - Earthquake, Tsunami
 - Volcanic explosion
 - Abnormal weather (typhoon, localized torrential rain)
 - Unusual oceanic/space phenomena
 - Nuclear accident, radiation accident
 - Infection disease, disease germ
 - Food contamination, livestock disease
 - Environmental contamination, atmospheric pollution
 - Malfunction of ICT systems, information leakage
 - Economic crisis
 - Terrorism, invasion

Toward “Science for Society”

- ◆ Scientists should work for gaining credibility and also making scientific knowledge fully exploited in forming social consensus and policy.
 - ◆ The credibility of scientists as independent, non-partisan and fair people have become vulnerable after 3.11, while existing code of conduct does not guide scientists’ ethical actions.
- ◆ Scientists themselves should establish a code of conduct and rules of actions.
- ◆ The code of conduct of scientists should be autonomous and universal beyond the administrative institution such as the separation of the three branches of administration, legislation and judicature.
- ◆ Scientists’ healthy relationship with politics, mass media and society can be cultivated through accumulated experiences under the mutual understandings.
- ◆ Globally equivalent code of conduct is necessary to facilitate international collaboration in research and development.