Uncertain Times
Changing Principles
Lessons of Fukushima Nuclear Accident

Kiyoshi Kurokawa, MD
NAS, Washington DC
June 20, 2013
2011
03.11  Fukushima Nuclear Accident
09.30  New Law for NAICC- First time in Japan
12.08  Commission began with 10 Commissioners

2012
07.05  Commission Report Submitted

2013
04.08  First hearing of NAIIC by the National Diet
Our Mission (Mission Impossible)

- Investigate direct & indirect causes of the accident independent from any political influences
- Responses, damages, sequence of events and actions taken and its effectiveness
- History of decisions and approval processes regarding nuclear energy policies
- Recommend measures to prevent future nuclear accidents
What we did not do

- Future energy policy
- Damage compensation issues
- Decommissioning processes / technology
- Disposition of spent nuclear fuel rods
What we did

- 20 Commission meetings with 38 key people
- 900 hours of hearing with 1,167 people
- 9 nuclear power plant visits, 3 overseas visits
- Evacuees survey (10,633 person)
- On-site workers survey (2,415 person)
- Town meetings- over 400 attendees

- All Commission meetings broadcasted live and Online with simultaneous English translation
Some key features/words in our report

Facts based document with 7 recommendations
-and for world peer review

Transparency
Security
Open to the public and to the world
Conclusion (9 points)

1. ”Manmade disaster”
2. Damages by Earthquake possible
3. Organizational problems within TEPCO
4. Emergency response issues (Kantei)
5. Evacuation issues
6. Public health and welfare issues
7. Reforming the regulators is essential
8. Reforming the operator & TEPCO
9. Reforming laws and regulations
Conclusion (9 points)

1. "Manmade disaster"
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“Regulatory Capture”

George Stigler (Novel laureate, 1982)

Many examples in the world
Issues Unique to Japan?
Groupthink

‘Elites’ of Japan (prior to 3/11)
--‘Moral and Ethics of Elites’
--Lack of Sense of Accountability

‘Mindset’ -Culture?
‘Made in Japan’?
Seven Recommendations to the National Diet

1. Monitoring/protecting independence of nuclear regulatory body by the National Diet
2. Reform the crisis management system
3. Government responsibility for public health and welfare
4. Monitoring the operators
5. Criteria for the new regulatory body
6. Reforming laws related to nuclear energy
7. Develop a system of independent investigation commissions
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‘Black Swan event’

Accident Happens
Machine Breaks
To Err is Human
Uncertain Times
Changing Principles
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Global World

‘Hot, Flat and Crowded’ (2005) to

Inter-dependent
Hyper-connected
Fragmented and Fragile
Figure 1. Long-term world population growth, 1750–2050. Source: United Nations Population Division.
Incunabula

Printed books in Europe from mid-15th Century of Gutenberg to year 1501

About 40,000
99%
Resilience

instead of Strength
Risk instead of Safety
Major Global Risks in Terms of Impact and Likelihood

Severe income disparity
Chronic fiscal imbalances
Rising greenhouse gas emissions
Cyber attacks
Water supply crises
Management of population ageing
Corruption
Climatological catastrophes
Biodiversity loss

WEF GAC 2013
Building National Resilience to Global Risks

P  Emphasize resilience  Use anticipatory strategies
r  Hi  over anticipatory strategies
e  strategies

d  ________________________________
i  Strengthen resilience  Emphasize resilience over anticipatory strategies

c  Low  resilience  over  anticipatory strategies

amount Probability
b  Small  Large

ility Amount of knowledge and effective measures to deal
Obligation to Dissent instead of Compliance

Avoid Groupthink
Richard Feynman (1986)  
“For a successful technology, reality must take precedence over public relations, for nature cannot be fooled.”

Kiyoshi Kurokawa (2012)  
‘For daring to tell a complacent country that groupthink can kill’; Foreign Policy’s ‘100 Top Global Thinkers 2012’

AAAS Scientific Freedom and Responsibility Award
Trust of the People and the World

Follow the world standards
  Transparency
  Accountability
  Professionalism

Adapting to the changing global world
Recommendations

1. Global exchange programs
   multi-layered, 1-3 years, repeatedly
2. Sharing real experiences
3. Professional communication skills
4. Global standards and licensing

Not study, but REAL experience in other countries – foundation of Peer-review and
Practice

instead of Theory
‘Black Swan event’

Accident Happens
Machine Breaks
To Err is Human
The Real Weapon of Mass Destruction?
Thank you

Google me!

www.kiyoshikurokawa.com/en/
Saturation of artifacts in developed countries

The number of automobile ownership (2007)

<table>
<thead>
<tr>
<th></th>
<th>No. of automobiles million</th>
<th>No. of automobiles per population</th>
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<td>Japan</td>
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</tr>
<tr>
<td>India</td>
<td>13</td>
<td>0.01</td>
</tr>
</tbody>
</table>

Source: Japan Automobile Manufacturers Association, Ministry of Internal Affairs & Communications
Pull

instead of Push
Crowds instead of Experts
Major Global Risks in Terms of Impact and Likelihood

- Severe income disparity
- Chronic fiscal imbalances
- Rising greenhouse gas emissions
- Cyber attacks
- Water supply crises
- Management of population ageing
- Corruption
- Climatological catastrophes
- Biodiversity loss

WEF GAC 2013
National Resilience

Five Subsystems and Five Components

**Subsystems**
- Economic
- Environmental
- Governmental
- Infrastructure
- Social

**Components**
- Robustness
- Redundancy
- Resourcefulness
- Response
- Recovery