

**SOCIAL DECISION--MAKING AND THE  
'SMALL' TECHNOLOGIES:  
LESSONS FROM THE CASE OF WIND  
TURBINE TECHNOLOGY"**

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# Self-introduction

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- Project Assistant Professor of Dept. of Nuclear Engineering and Management, U Tokyo
- Sociologist of Science and Technology
- Research interests:
  - ▣ Public Interests and Science & Technology
  - ▣ Social Decision-making Process on Siting of Energy Facilities
  - ▣ Social Scientific Literacy Education for Technical People

# Points of Today's Talk

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- Towards the good future of SMRs technology and society...
  - ▣ Think about the 'scale' and 'image' of technology and societal reactions
  - ▣ Conventional NPPs case and wind turbine case: comparison of two polarized cases
- Keywords
  - ▣ Public perception
  - ▣ Public sphere and local consensus
  - ▣ Asymmetry principle of trust & Stigma
  - ▣ Decision-making process
  - ▣ Participatory upstream TA

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# Wind power case and its lessons

From the symbol of 'eco' to NIMBY facility

# Comparing Two Technology: Conventional NPP and Windmill

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	<b>Conventional Nuclear Power</b>	<b>Wind Power</b>
<b>Characteristics of Technology</b>	<p>Sensitive issue in society</p> <p>Complicated technology</p> <p>Potentially high risk</p> <p>Huge plant</p>	<p>Based on conventional elemental tech.</p> <p>Not so high risk</p> <p>Looks simple</p>
<b>Impact to Society</b>	<p>High costs (Economic impacts are very big)</p> <p>Need to establish complicated social infrastructure</p> <p>Can supply much electricity</p>	<p>Low costs</p> <p>Can supply small amount of electricity</p> <p>Function as a symbol of environmental protection</p>
<b>Impact to Siting Area Community</b>	<p>Environmental Issues</p> <p>Big direct economic impacts (Demands, Employment, Subsidy money from gov't)</p>	<p>Good icon of regional development</p> <p>Small economic impacts</p>

# Windmills become 'NIMBY' Plants?

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## □ Wind Power Generation

### □ Very Positive Image

- Safety, Clean and Environmental Friendly

### □ Change the Situation?

- Not a few Local Controversies in Siting Areas
- Environmental Protection Issues (Landscape, Wild Birds and so on)

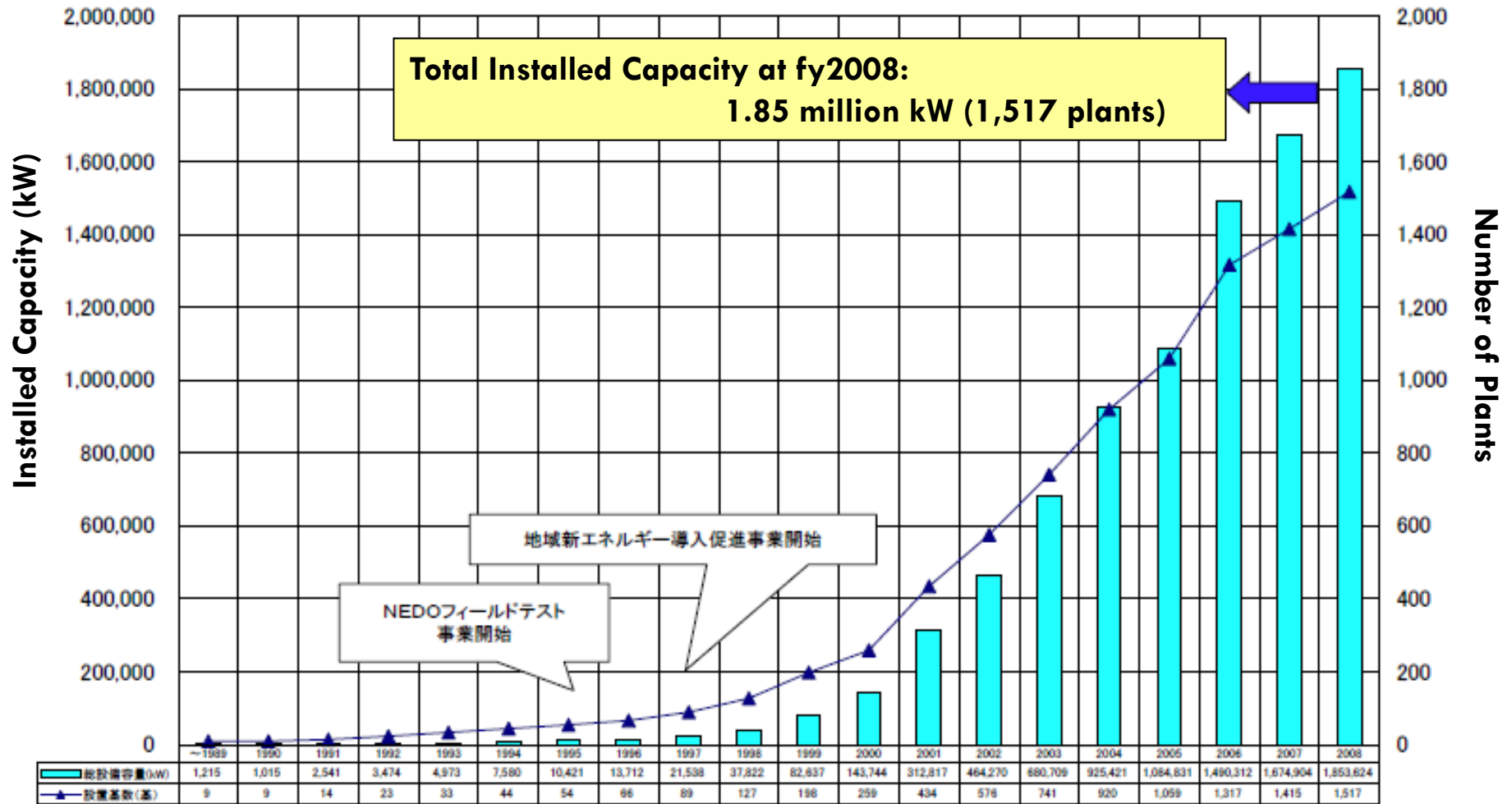
### □ Now Windmills are considered as the 'NIMBY' Plants?

# Our Questions

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- Why windmills becomes 'NIMBY' though they have good images
- How we should understand the local controversies on wind power siting?
- How can we establish or improve more functional decision making process?

# Current Status of Introduction of Wind Power Plants in Japan



# Japan's National Policy on Introduction of Wind Power

- Two Governmental Guidebook Published (1996)
  - ▣ By NEDO (New Energy and Industrial Technology Development Organization)
  - ▣ By Ministry of Environment (Former Environment Agency)
  
- Numerical Target by National Government
  - ▣ 3 million kW of installed capacity at 2010 (1998, Special Law)
  - ▣ Reduce 34 million tons of CO<sub>2</sub> by Introduction of Wind Power until 2012 (1998;2001, National Master Plan)

# A Gap between Experts and Citizens

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- In early 2000s...
  - Energy experts: skeptical stance to wind power technology
  - Public opinion: consider it as a 'Clean' and 'Environmental Friendly' technology
  - No strong criticisms and protests
  
- Rapid wind power introduction has been supported by positive public opinion

# Situations are now changing

- Not a few local controversies in siting areas
  
- Points of Controversies
  - General Environmental Protection
  - Landscape Protection
  - Wild Birds Protection
  
- 9 local controversies from 1997 to 2003, and 2 siting plans were canceled (Baba, Kimura and Suzuki, 2005)

# Table of Controversies in Siting Areas (1997 - 2003)

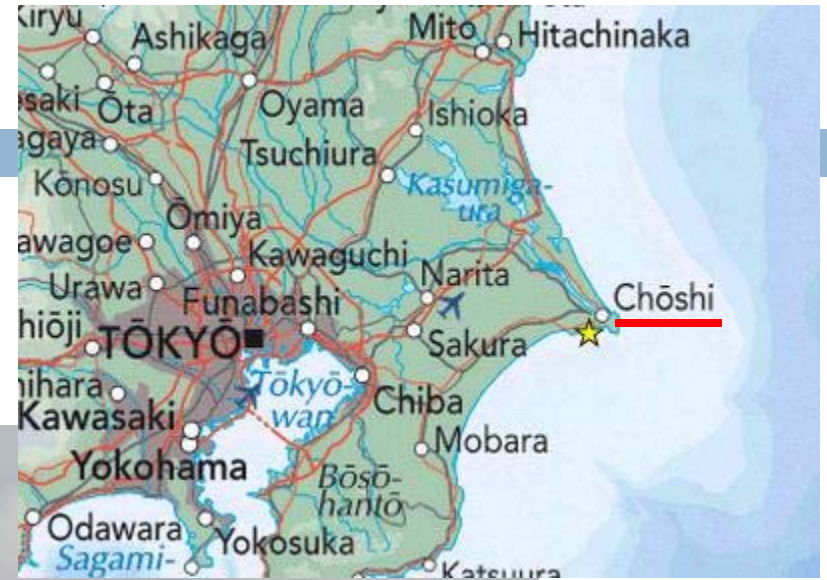
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Year	Area	Developer	Scale	Regulations	Points of Controversy
1997	Wakkanai-city, Hokkaido	Private Company	400kW*3	No Special Regulation	Landscape + Wild Birds
1999	Kamaishi-city, Iwate	Private Company	1000kW*43	No Special Regulation	Wild Birds
2000	Sanriku-town, Iwate	Semi-Public Venture	1000kW*10	Prefectural Natural Park	Wild Birds
2001	Sakata-city, Yamagata	Private Company	1500kW*20	Prefectural Natural Park	Desert Hill + Pine Forest
2001	Hisai-city, Mie	Semi-Public Venture	750kW*20	Semi-National Park Protected Forest	Landscape + Wild Birds
2002	Kuzumaki-town, Iwate	Private Company	1750kW*12	National Forest	Wild Birds
2002	Hamada-city, Shimane	Private Company	1500W*1	Prefectural Natrural Park	Landscape + Regional Economic Development
2003	Wakkanai-city, Hokkaido	Private Company	1000kW*57	No Special Regulation	Wild Birds
2003	Koriyama-city, Fukushima	Private Company	1000kW*55	No Special Regulation	Wild Birds

■ : Canceled Project (Soruce: Baba, Kimura and Suzuki, 2005)

# Choshi Area Case

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# Potentially Controversial Points in Choshi-city Area

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- Controversial issues appear recently
  - ▣ Landscape issues, recently
  - ▣ Shadow problems by fin blades of the windmills
- People have inaccurate knowledge
  - ▣ Electric bills are discounted by wind power
  - ▣ Electricity from windmills supply to inside the local area
- People may change the attitude to windmill siting if they have more detailed information

# Recent criticism against windmill

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- Criticism against windmills are emerging not only in Choshi-area, but also in other area in Japan
  - ▣ ‘Low-frequency sound issue’: become several local disputes in Japan
    - “It has negative impact on the health”
    - “Experts, power company and/or government keep it secret”
  - ▣ Environmental issues are still going on
    - Bird protection, landscape protection and noise issues

# NIMBY and Technological Determinism

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- The aspect of the public interests adjustment problem should not be forgot
  
- Public opinion tend to consider NIMBY from the point of view of technological determinism
  - ▣ Nuclear – Dangerous – Bad Technology
  - ▣ Wind Power – Environmental Friendly – Good Technology
  
- Nuclear cases and Wind Power cases are often understood in very different way

# Contrastive, but can find Common Points

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- Very contrastive process
  - ▣ Formal process for Nuclear: too rigid
    - Strong emphasis only on the 'safety' issues
    - Economic negotiation is carried out within small range of stakeholders
  - ▣ Formal process for Wind power: too premature
    - Hidden assumption: it doesn't become matter
    - Regulation has been established gradually, but its scoping is still limited only on "environmental" issue
- But similar results
  - ▣ Mechanisms are different but the consequences are very similar: Fail to deal with social conflicts well

# No public sphere, no robust consensus

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- In both case, there is no public sphere in which people discuss about the technology from broader perspective
- It means the local consensus in siting area is often not so robust
- Once some negative thing happens, the consensus may be destroyed easily and completely

# 'Asymmetry principle of trust' and 'Stigma'

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- Asymmetry principle of trust (Slovic, 1993)
  - ▣ It needs very long term to establish the trust from public
  - ▣ But, it will be collapsed easily and completely, by only one negative event; severe accident, big scandal, serious misconduct, etc.
- Stigma (Goffmann, 1963)
  - ▣ Originally, it means the tattoo used to identify slaves and criminals
  - ▣ Once negative image is imposed to something, it often become irreversible, path-dependent change
  - ▣ This discrimination is very structural
    - e.g. People in minority group behave as if the situation is invariable spontaneously
  - ▣ Does nuclear technology have strong 'stigma'?

# Lessons from the comparison

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- Not only public, but also experts are affected by the image/stereotype of technology
  - ▣ Social institution often influenced by it too much
  - ▣ It would be spoiled the public deliberation by the stereotype-based decision-making process
- Such kind of perception may be changed very easily, especially by any kind of negative event
  - ▣ Public perception for windmill become negative in some case in Japan
  - ▣ If this kind of change happen once, it will be very difficult to reverse the situation (A symmetry principle of trust, 'stigma' concept)

# Implications for nuclear engineers

Towards a good relationship between SMRs technology and Society

# How about the SMRs technology: Comparing Three Technology

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	<b>Conventional NPP</b>	<b>SMRs</b>	<b>Wind Power</b>
<b>Characteristics of Technology</b>	<p>Sensitive issue Complicated High risk Huge plant</p>	<p>Looks simple? Looks different from conventional NPP?</p>	<p>Conventional tech. Not so high risk Looks simple</p>
<b>Impact to Society</b>	<p>High cost Complicated social infrastructure Much electricity</p>	<p>Relatively cheap? Easy to install &amp; maintenance? No complicated infra (e.g. huge grid system)</p>	<p>Low costs Little electricity Symbolic (eco)</p>
<b>Impact to Siting Area Community</b>	<p>Environment issue Big economic impacts</p>	<p>Moderate economic impact? Good icon or negative one?</p>	<p>Good icon Small economic impacts</p>

# Possible solution:

## upstream technology assessment

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- Common point in both cases
  - ▣ Experts respond to public *RE-ACTION* after the technology INTRODUCED and DIFFUSED
  - ▣ But, at that point, it is a little bit too late: because the reality is path-dependent and irreversible
- ‘Participatory Upstream TA (technology assessment)’ may become a possible solution
  - ▣ Experts and citizens make collaborative assessments from the early stage of technology R&D
  - ▣ This is not an additional regulation against engineers, but a collaborative way to seek good relationship among technology and society
  - ▣ EU is a front runner of this kind of methods

# Engineers IN society, WITH public

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- Vertical model of experts-citizen relationship is a little bit out of date
  - ▣ Both direction is not appropriate to grasp the reality
    - Experts lead the society and public ('top-down' or 'decide, announce and defend')
    - Experts should obey the society's decision ('civilian control of technology')
- Horizontal model between engineers and citizen should be shared
  - ▣ To do it, both side have to develop some capability to deal with techno-scientific issues together
    - Cf. "Social-scientific literacy for nuclear engineers" summer school by UCB-UT collaboration