Renewable Energy and Social Innovation in Japan

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Study approach

To examine and conceptualize “social innovation” through renewable energy sources (RES) on to;

- Energy & environmental policy and political arena
  - Local and national level in reflection with international discourse
- Economic and technology arena,
  - incl. energy infrastructure and energy industry structures
- Social and public arena, as a main topic

“social innovation through RES” in this context;

- changing the rule of distribution of risk-benefit and the role of social actors, that leads co-evolution of technology and social system

Two typical cases in Japan

roof top solar PV

- More than 80% of PV are installed on roof-top of private household in Japan
- What roles people played to promote solar PV under ineffective RES policy circumstances

community wind power

- Newly arise since 2001, now (only) 10 wind turbines but socially well-known all over Japan and some Asia countries
- Possibility of new social “movement” by peoples’ initiative

Renewable Energy Policy and Politics as a background

"RE policy into mainstream" in the international policy arena

- G8, WSSD, CSD, COP/MOP
- Arise of new international networks
  - REEEP, REN21, JREC …
- Negative attitude of Japan's Gov. toward RES policy
  - Both from international and domestic politics

Status of Japan's Renewable Energy Policy

Rather than promoting RES but impeding, because of;

(1) inappropriate choice of policy options

(2) target and time table set too low

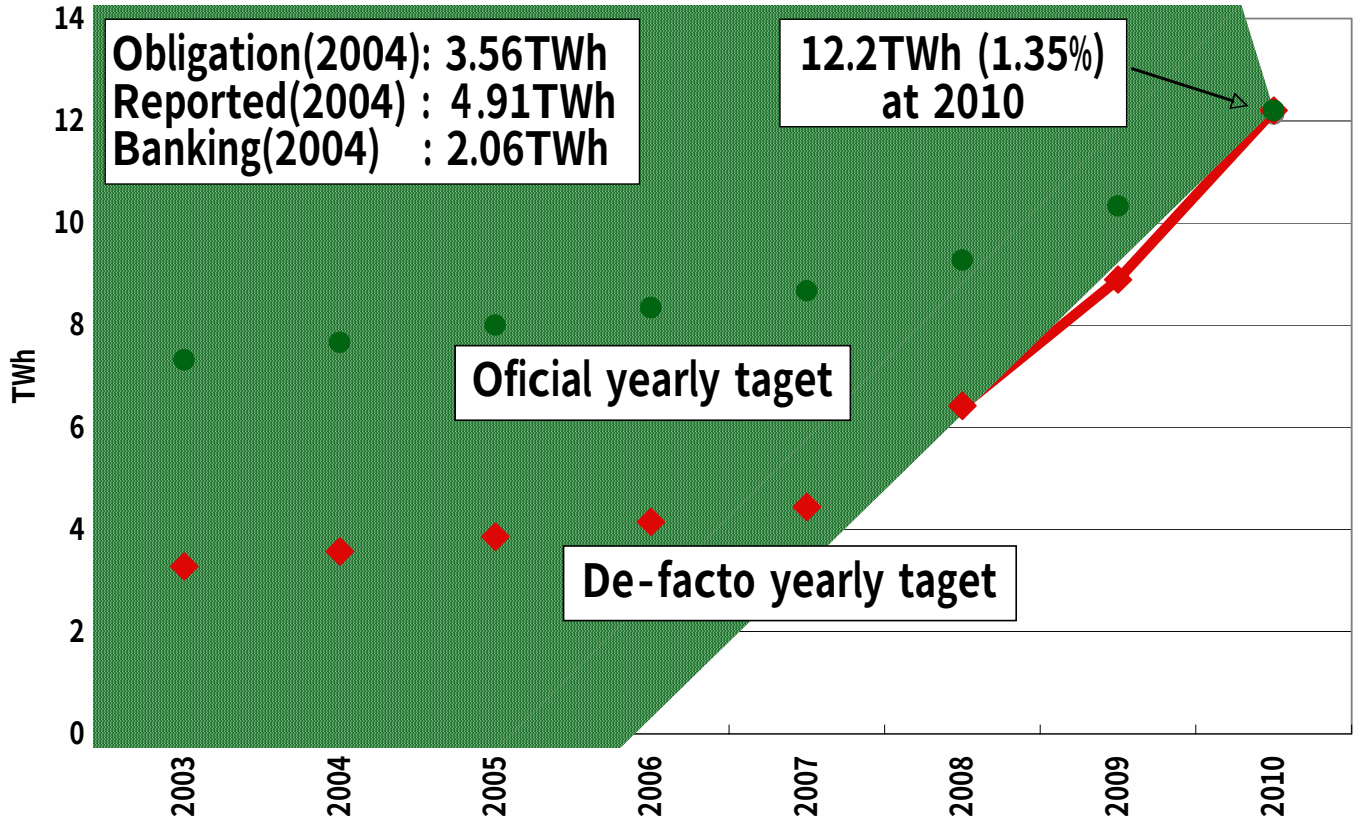
(3) inappropriate policy measure design

(4) the huge influence of the power companies' discretion, and

(5) grid issue

Japanese RES “market”

Too small “target” because of strongly biased energy politics



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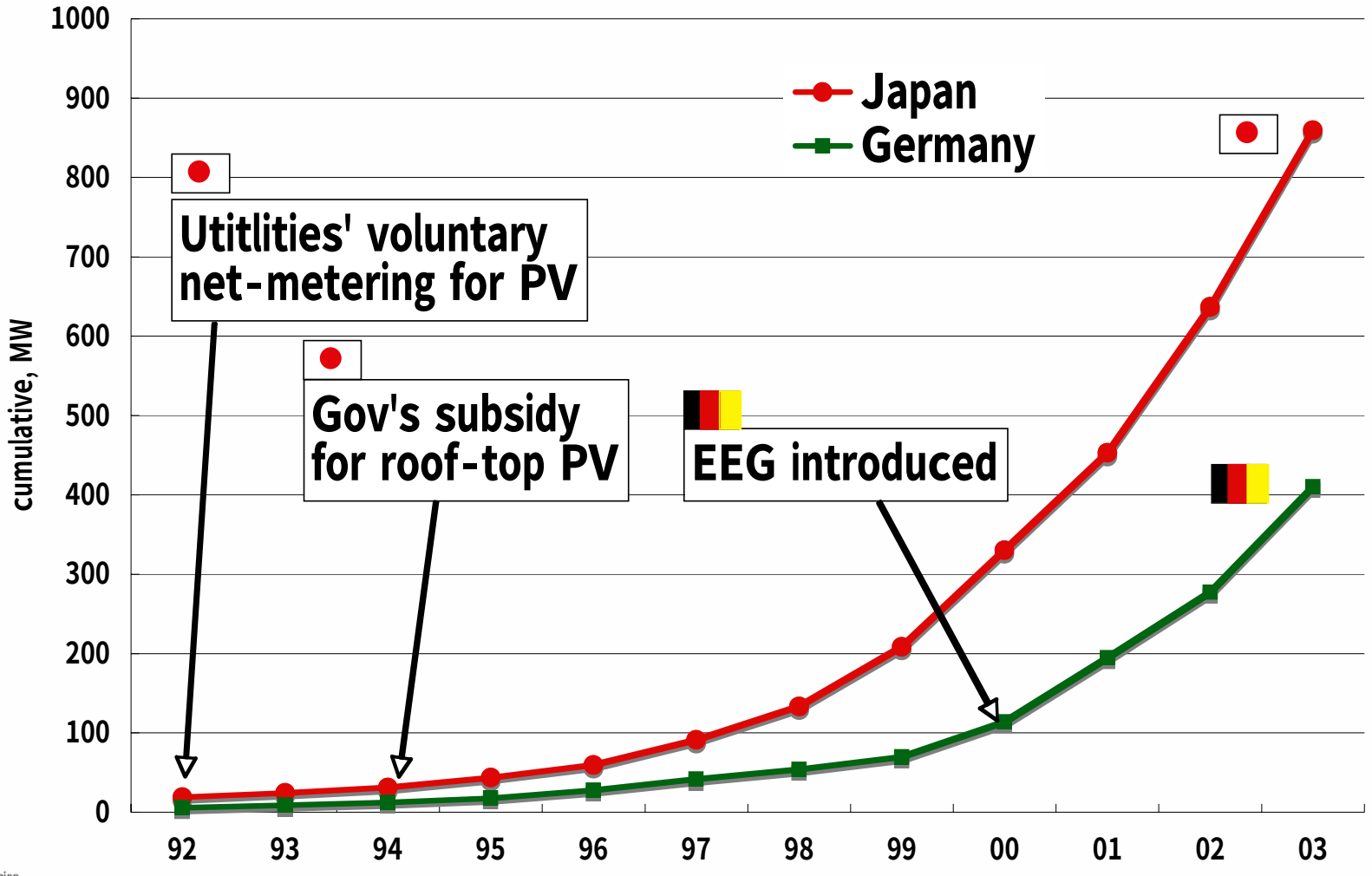
Japan as the world PV top-runner … by “political accident”



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Possibly “Solar tragedy” again because of “policy disaster” …

New RPS legislation in 2003

- Japan’s Gov. introduced RPS (political quota of RE) in 2003, while el-utilities’ voluntary program for PV was left as it is,

Ending up Gov’s PV subsidy in 2005

- Japan’s Gov. recently announced to end up the initial subsidy for PV, that is economically small but politically important, while

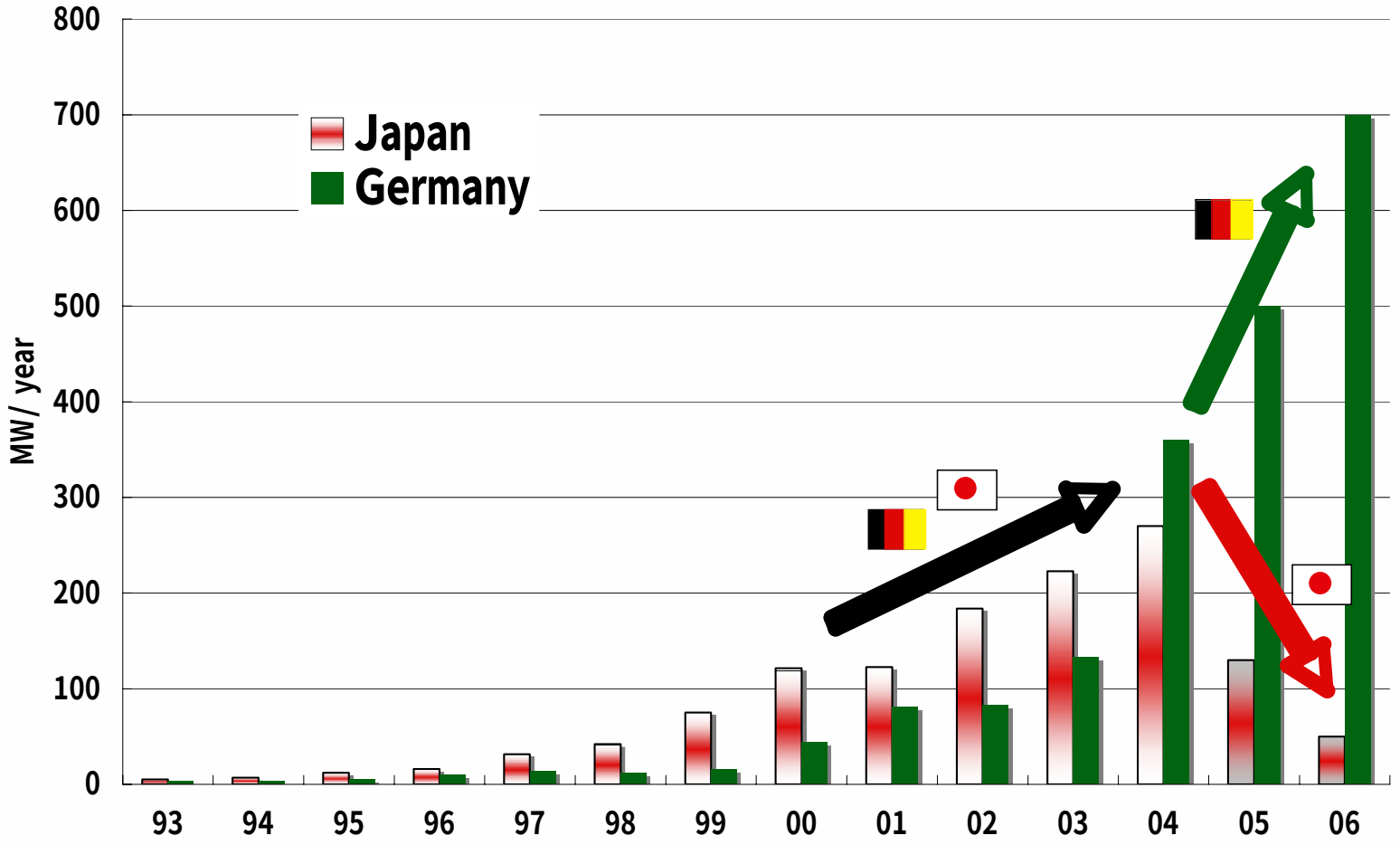
Coherent ending up PV voluntary net-metering in 2006 ?

- El-utilities (de-facto 10 regional monopolies) start to considering to give up their voluntary net-metering program for PV due because of increasing financial burden,

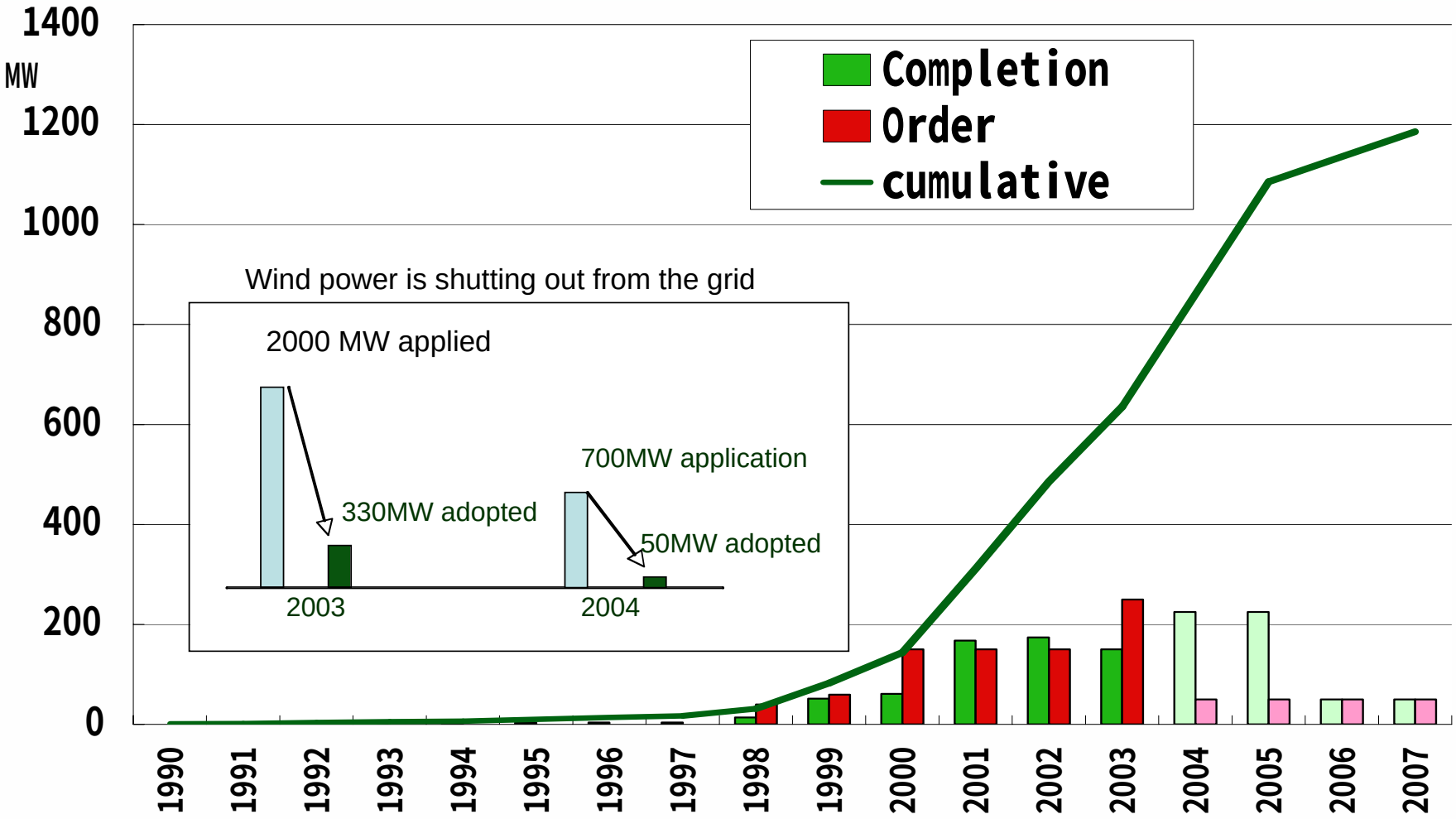
No public policy fill the gap

- Japan’s Gov. has no idea to improve badly designed their RPS law

… will most likely turn into “2nd solar tragedy” by policy disaster



"Wind tragedy" - Shrinking Japan's wind power market



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"Wind tragedy" - Japan's wind power market are shrinking because

No real "market" under new RPS (quota obligation) law

- 99.5% of the certificate "market" is covered by the 10 regional monopolies, historically harmonizing their response toward energy policy precisely through their association (FEPCO)
- Owing to small target and slow progress,surplus of the certificate will continues at least 5 years

Grid issues as a "good excuse" for electricity monopolies

- Grid connection issue, such as "stability of electricity supply", is good excuse for the monopolies to exclude "fluctuating" wind power
- Small target and slow progress set by Japanese RPS allow the el-monopolies to set the ceiling for new renewable and bidding

As a result, markets for wind power as well as other new renewable electricity market are shrinking

2 Social Innovation in Photovoltaic

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Research Questions

Does the installation of residential PV systems increase environmental behavior of households?

- If it is true,
  - Why does the phenomenon happen?
  - What kind of mechanism is working there?

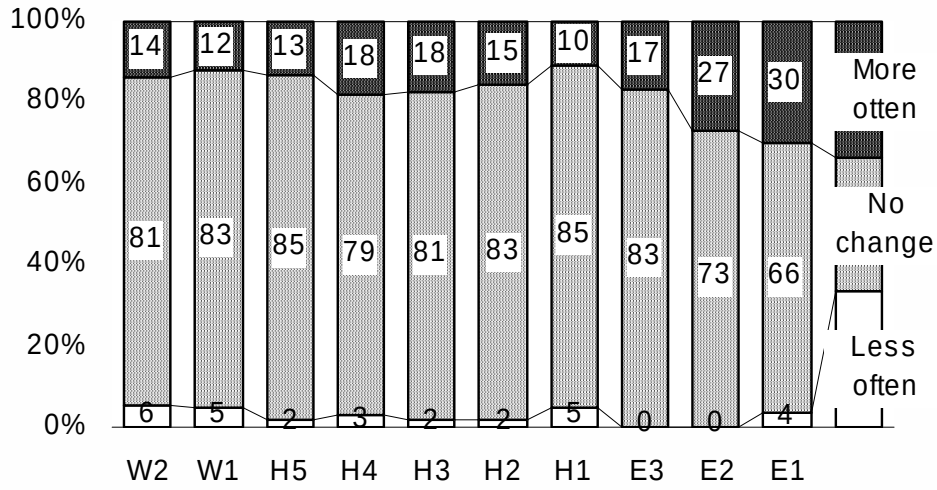
Date collection by questionnaire survey

Period	23 Feb. 2004 –15 Mar. 2004
Respondents	200 of households with PV systems in Iida-City, Nagano-Prefecture, Japan 1) the ratio of households with PV systems is high 2) Unique community activities are maintained
Method	Mailed questionnaire (questionnaire design <- interview survey)
Response	137 (68.5%)

Effects of PV system

Changes in environmental behavior

- 30% of all households said they save electricity more often after installing a PV system.
- 10-20% of households responded that they save heat and water more often.
- A few percent of households responded that they did worth after installing PV system.

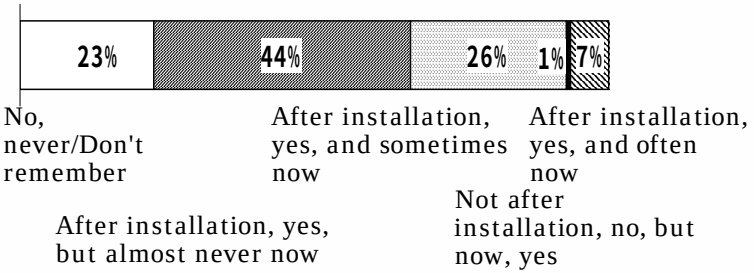


E1: Turn off the lights when going out even for a short time.
E2: Unplug or switch off the main power of an electrical appliance when not using.
E3: Shorten the duration that the refrigerator door is kept open.
H1: Reduce the use of the heater by wearing warm clothes.
H2: Properly close the room when you use the heater.
H3: Turn off the heater when going out even for a short time.
H4: Set the temperature as low as possible even if you feel a little cold.
H5: All family members stay in one room to avoid using many heaters.
W1: Not keeping the shower running when you are using soap or shampoo, etc.
W2: Not keeping water running when you are washing your face or brushing your teeth.

Effects of PV system

Communication chance and environmental behavior

- PV system provide owners chases to communicate family members and other owners.



- Environmental behavior can be activated if,
  - family members have chance to check and discuss about PV system and energy usage.
  - owners have chance to communicate.

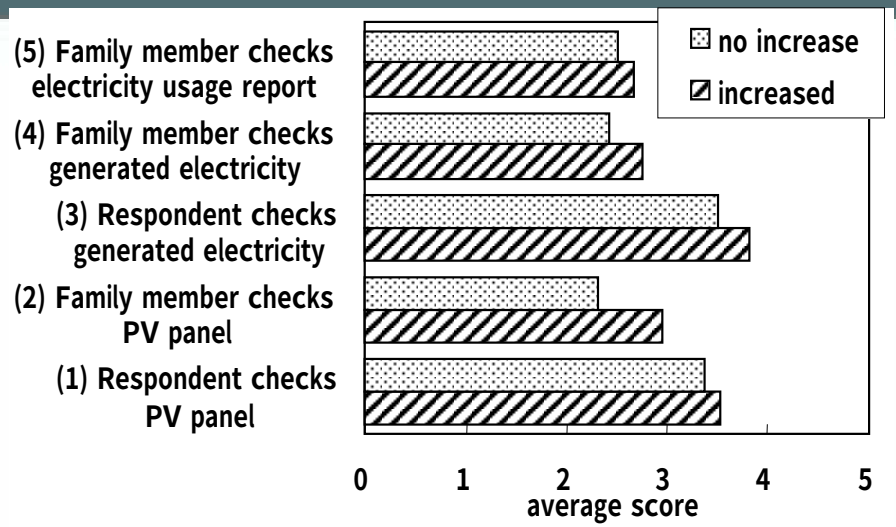
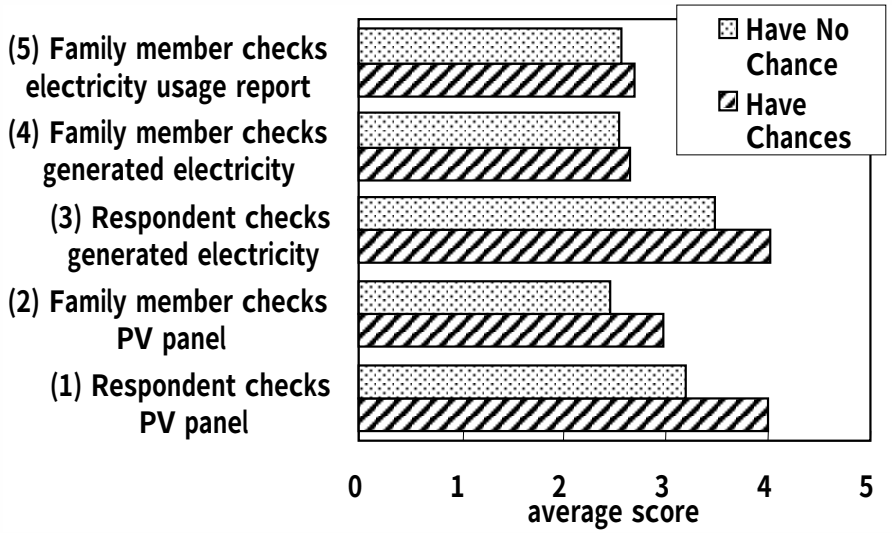


Fig. Relationship between PV system checking and change in environmental behavior



Relationship between PV system checking and communication between PV owners

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3 Social Innovation in Wind Power

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Community wind power

Developing wind power as social venture

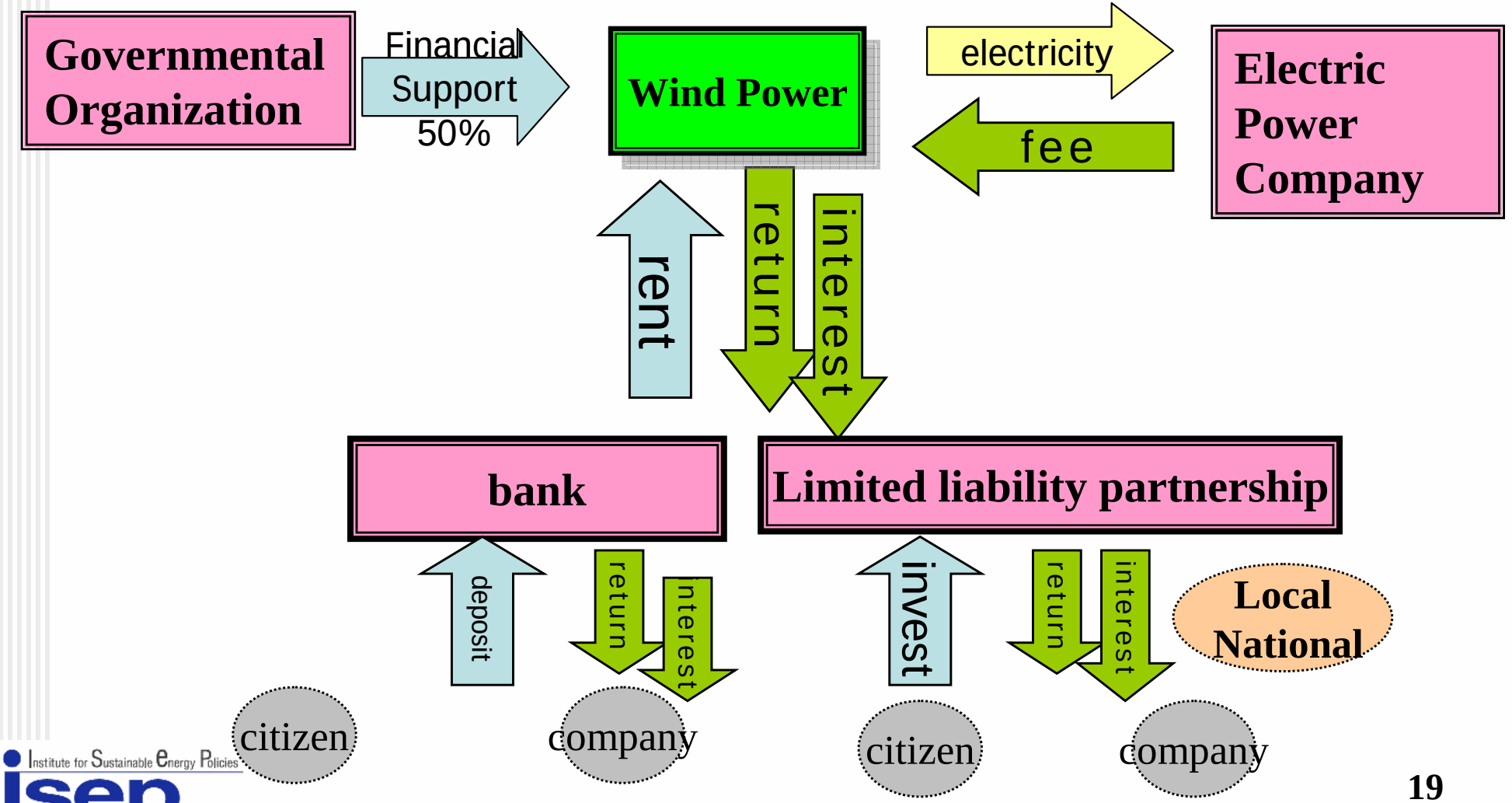
Social responsible invest

- 400-4000 Euro for one unit of invest(10-15 years)
- 1.5-3% of return

Additions for investor

- Certification card
- Meeting of investors
- Sign of investor on the tower

Shema of Social Invest



Community wind power

In 3 years
5 projects
(5 another projects are coming)
2000 investors
900,000,000yen
(about 6.4mil. EUR
1mil. CHF)

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Community wind power

Additions for local society

- Direct return to citizens and residents (200,000-300,000EUR)→“Sustainable fund” (Sustainable donation system)
- Various affection
  - Visitors
    - ✓300-750 investors for each project
    - ✓90% of them visit/ will visit the sight.
  - New social network
    - ✓A chance for various type of people to know each other
    - ✓New business chance

Community wind power

Wind power's name

Community wind power

Meeting of investors

Community wind power

Meeting of investors

Community wind power

Meeting of investors

Community wind power

Meeting of investors

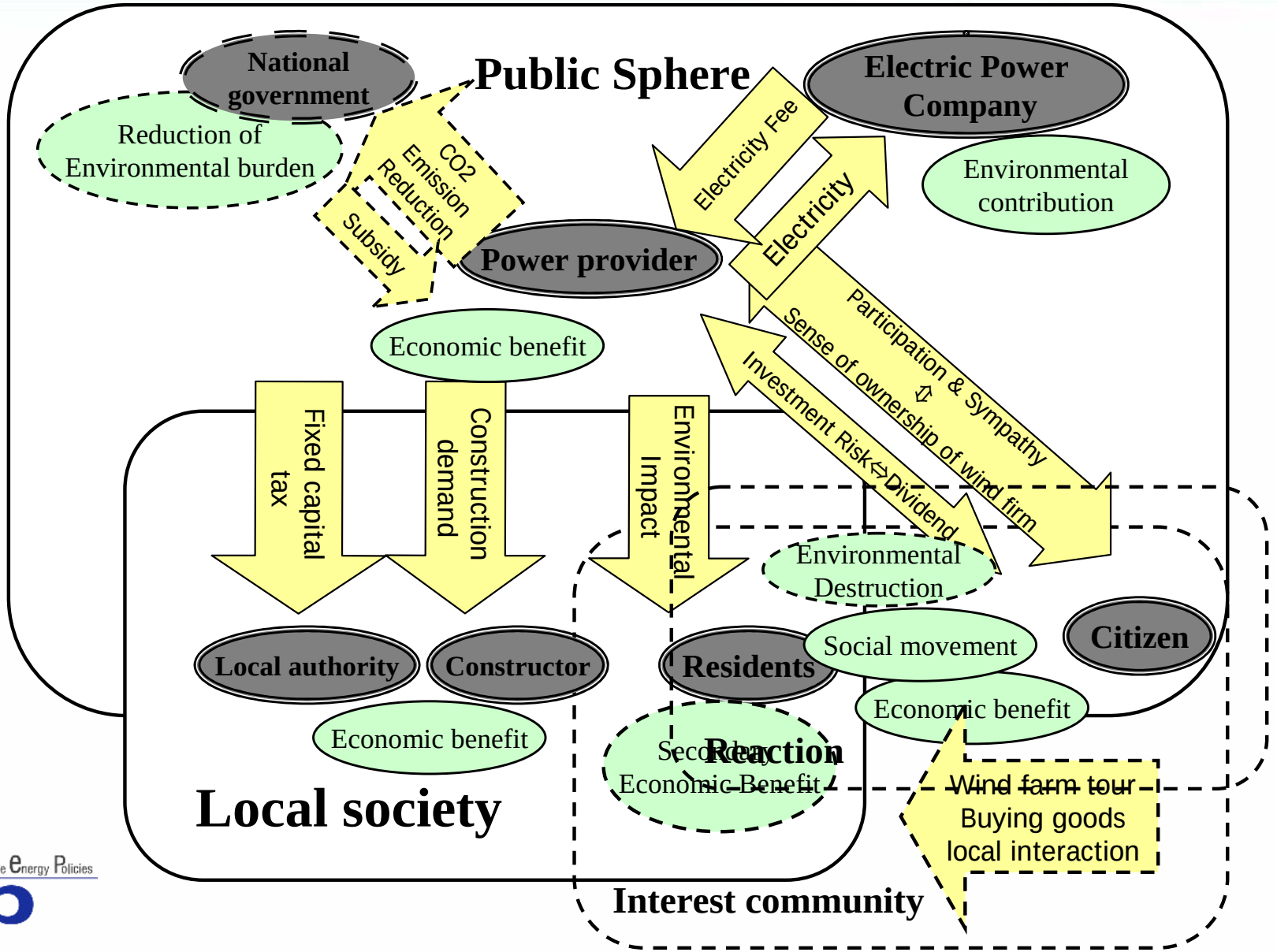
Community wind power

Meeting of investors

Community wind power

Recycle to renewable

Actor Network of Citizen Cooperative Wind power



Research Questions

Who invested to community wind power?

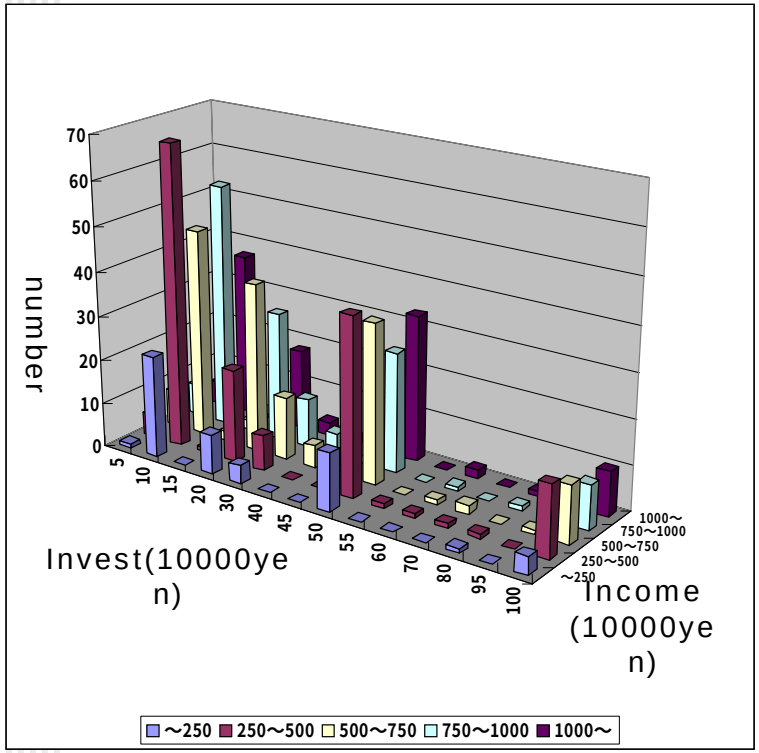
- Why does the phenomenon happen?
- What kind of mechanism is working there?
- What kind of incentives they have?

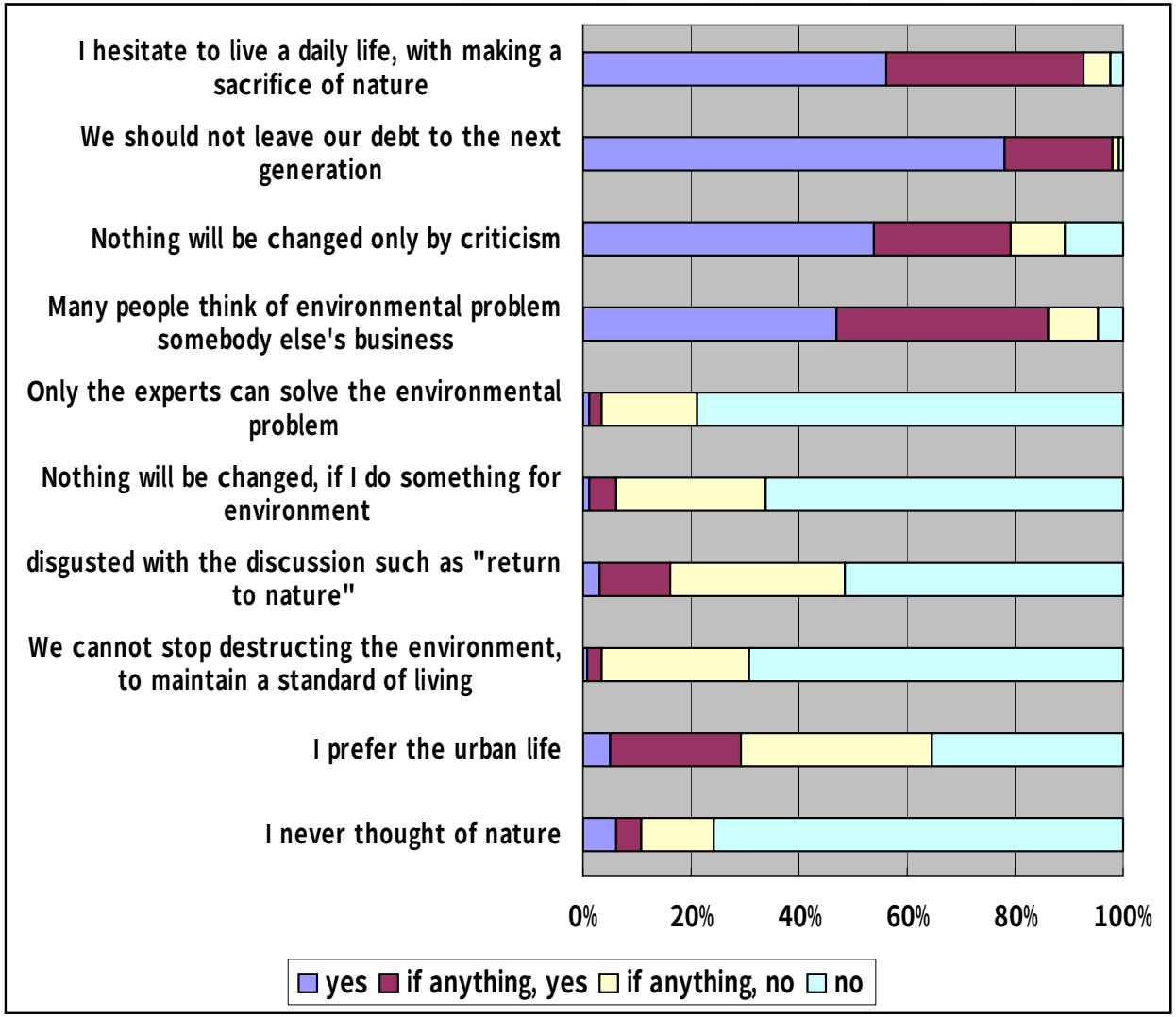
Date collection by questionnaire survey

Period	September. 2002 , Mar. 2004
Respondents	1222 investors of community wind power. 1) Hokkaido 2) Aomori(local) 3) Akita(local) 4) Aomori, Akita(Japan) 825 Non-investors, who hesitated to invest 1) Aomori(local) 2) Aomori, Akita(Japan)
Method	Mailed questionnaire
Response	Investors 688 (57.1 %) Non-investors 179 (21.7 %)

Characteristic of Investors

- Highly concerning about environmental problem
- No relation between amount of invest and income
- Distrust the others?





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Characteristic of Investors

Nothing will change, even if I do something for environment

	Many people think of environmental problem somebody else's business						
	yes			←→		no	total
yes	9.5%	1.9%	2.2%	0.6%	0.0%	1.3%	15.5%
↑	4.1%	2.2%	2.8%	1.3%	1.3%	0.0%	11.7%
↓	6.0%	1.9%	6.3%	2.8%	1.3%	0.6%	18.9%
	1.9%	3.8%	5.7%	2.8%	0.6%	0.9%	15.8%
	3.8%	3.5%	5.0%	1.9%	1.9%	1.6%	17.7%
no	6.3%	4.1%	2.8%	0.6%	0.6%	6.0%	20.5%
total	31.5%	17.4%	24.9%	10.1%	5.7%	10.4%	317

	Value	Df	Asymp. Sig. (2-sided)
Pearson Chi-Square	83.739	25	.000

52.1% (blue cells) think of the others worse than real

I leave the solution to environmental problem up to specialists

	Many people think of environmental problem somebody else's business						
	yes			←→		no	total
yes	1.2%	0.6%	0.9%	0.0%	0.3%	0.3%	3.4%
↑	0.9%	2.2%	1.5%	0.3%	0.3%	0.0%	5.2%
↓	1.5%	1.9%	5.2%	1.2%	0.9%	0.3%	11.1%
	5.9%	3.4%	7.4%	4.9%	0.6%	0.9%	23.1%
	5.2%	4.3%	4.3%	1.9%	2.5%	1.2%	19.4%
no	17.0%	5.2%	4.9%	1.9%	0.9%	7.7%	37.7%
total	31.8%	17.6%	24.4%	10.2%	5.6%	10.5%	324

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	79.865	25	.000

66.7% (blue cells) think of the others worse

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3 Incentives for invest

Incentives

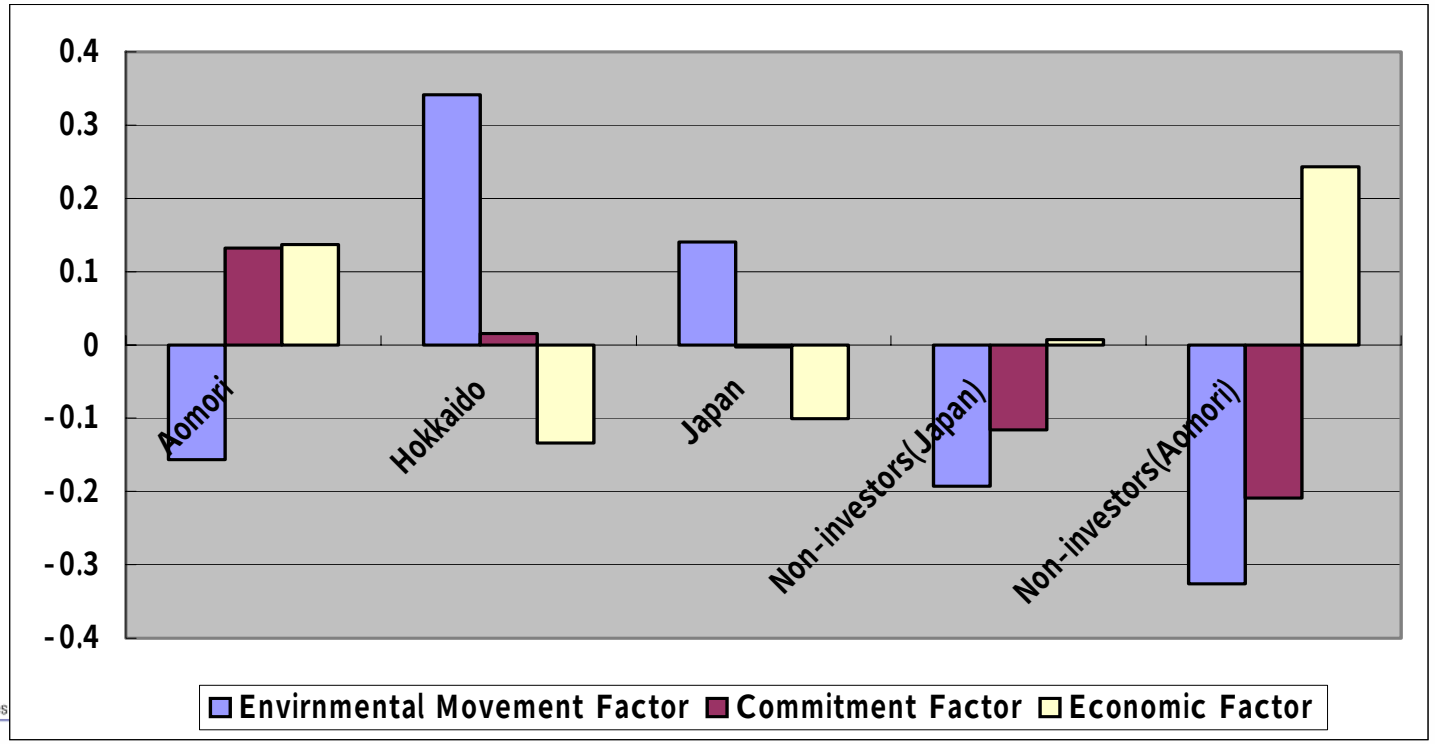
- Factor1 Environmental Movement
- Factor2 Commitment
- Factor3 Economic interest

Variable	Factor 1	Factor 2	Factor 3	Commonality
Support for citizens' movement (NPO)	**.531**	.171		.356
Not a donation	.137		**.851**	.719
Expecting a dividend		.121	**.810**	.720
Can inscribe name on windmill	-.164	**.751**		.556
Personal energy choice	**.726**	-.103		.492
To stop global warming	**.769**	-.114		.555
To reduce reliance on nuclear energy	**.642**	-.149		.515
Socially responsible investment		.103	.127	.455
Ownership of windmill	.370	**.819**		.658
Agree with citizen-funded windmill	.159	**.487**	-.321	.539
Easier to support than other environmental action		**.422**	.214	.306
Characteristic Value	2.743	2.024	1.103	
Contribution Rate(%)	24.937	18.398	10.022	
Factor Sampling: principal component analysis				
Rotation: promax method on Kaiser normalization				

Dynamism of Incentives

Potential 2 scenarios

- Sustainable environmental movement(Hokkaido)
  - Environment>economy
- Multi-stakeholder local development(Aomori)
  - Environment≦economy + commitment



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4 Conclusion

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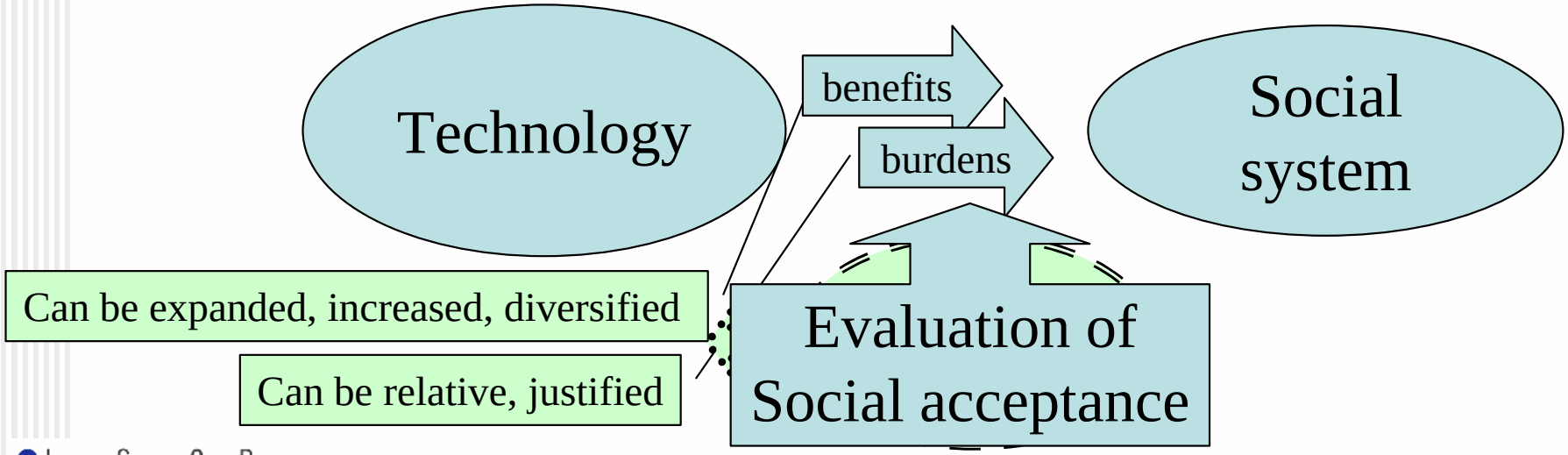
Case study shows…

Citizen's initiative can be one factor which affect the social acceptance of renewable energy. Because,

- The unique characteristics of the technology of a household PV system, including "being visible to the eye" and "self-producing electricity," have the potential to affect attitudes and behavior toward energy and the environment.
- Distrust to existing social system can also provide possibilities to spread new social system as a symbol of cooperation.
- Incentives of investing the community wind power (environment, commitment, and economics) co-exist in the schema. And these are opened to be selected in local societies, according to their major issues.

Discussions and farther subjects

- Not only economic “sustainable development”, but also mental, moral value （consciousness, participation, compassion, and cooperation） can activate the process to sustainable society.
- The advantage and disadvantage of renewable energies can be dynamic constructed by social system(s).
- Co-evolution of technology and social system should be tested and verified in the frame work of social innovation experiment (changing the rule of distribution, the role of social actors…) .



Vielen Dank!!
Thank you!!

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