Environmental Technology Verification Program in Japan

13 July 2005
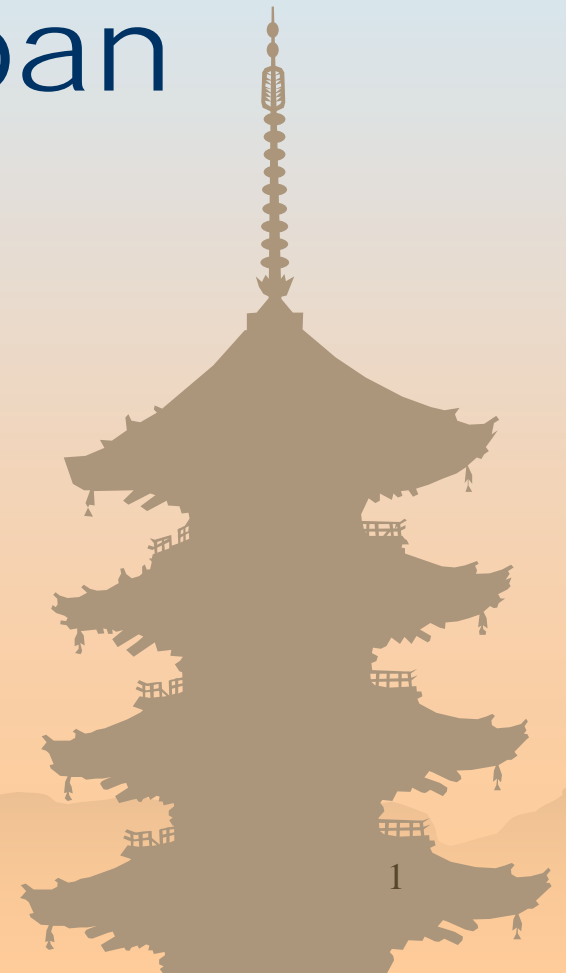
ETV International Forum, Washington DC

Ministry of the Environment, Japan

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Ministry of the Environment, Japan

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Outline

I. Background and Objectives: Why Necessary?

II. Outline of Program: Structure, Budget, Target Technologies

III. Example of Tech. Category: Small-Scale Organic Wastewater Treatment

IV. Impacts of Verification: Questionnaire Responses

V. Future Topics: Pilot Period and Beyond

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I. Background & Objectives

I-1. Governmental perspective on importance of environmental technologies (and their evaluation)

2002 Basic Policy on Economic and Financial Management and Structural Reforms (Cabinet Decision, June 2002)

- ❀ "Japan's environmental industries are world leaders thanks to certain national competitive advantages, and will help to stimulate major innovation in our socio-economic system."

- ❀ "One challenge is the need to create frameworks to obtain proper market assessments of innovative environmental and energy-related technologies."

Report on Promotion Measures for Environmental Research and Technology Development (Central Environment Council, April 2002)

- ❀ "In order to properly promote the development and spread of environmental technologies, it is important to have objective technical assessments of their environmental protection effects, etc."

- ❀ "It is necessary to significantly improve technology assessment methodologies, to establish institutional arrangements for implementation, and to consider ways to widely utilize the assessment findings."

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I. Background and objectives
I-2. Objectives of ETV Pilot Program

* For advanced environmental technologies for which no objective performance data exists, promote the spread of technology by having independent parties verify performance of the technologies. This will promote both environmental protection and environmental business.
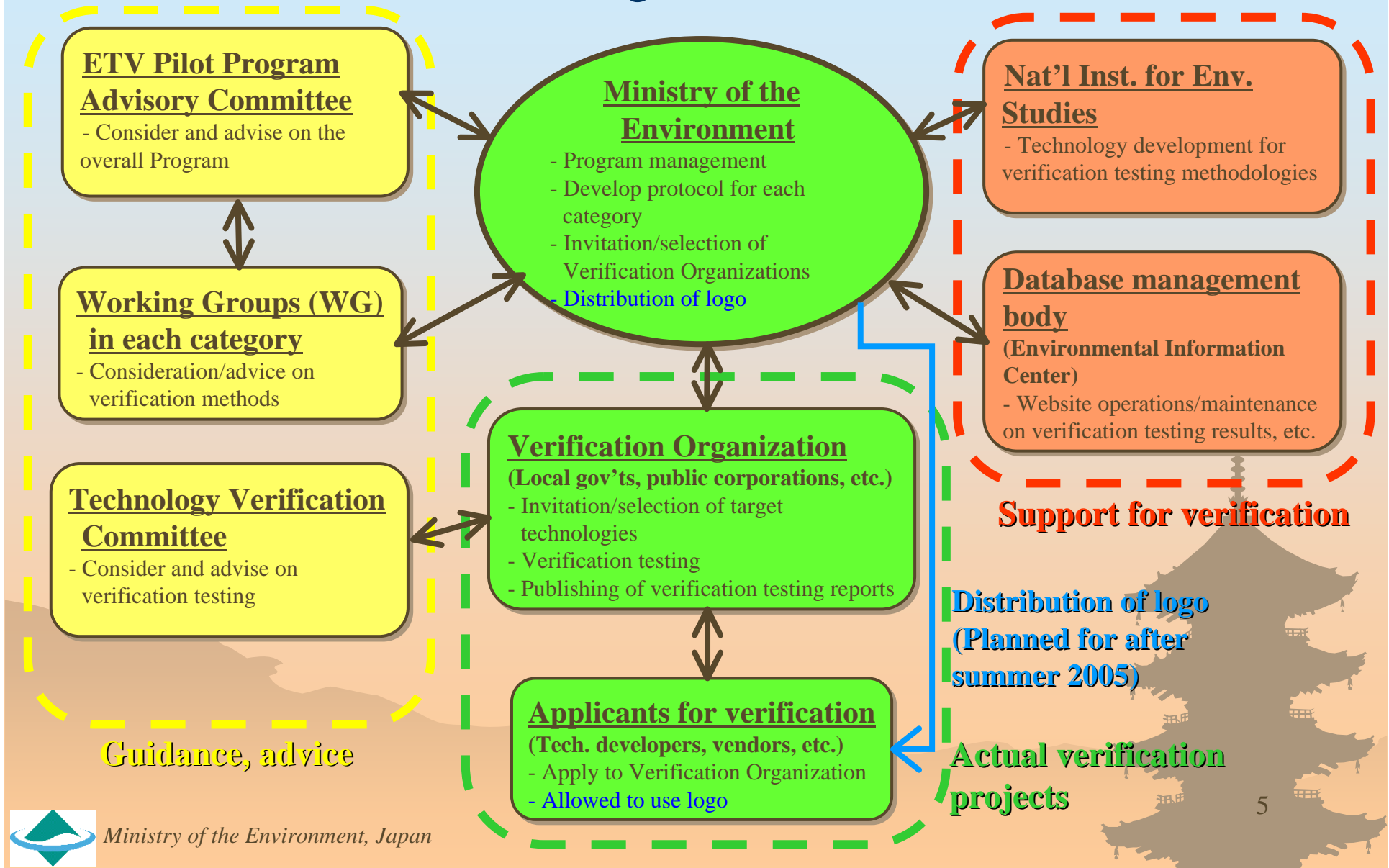
  Note: "Verification" differs from "certification." Under the verification program, technologies are not judged as good or bad according to some standard. Evaluation of data is left up to users.

* 2003 to 2007 is the pilot period to establish a verification system. Verifications on a trial basis will be conducted in representative technological categories, which will lead to Phase 2 in which venders will be expected to pay for verification services.

* Starting in FY2008 the technology categories will be expanded, and the verification program will enter into full operation.

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II. Outline of the Program

II-1. Program Structure

ETV Pilot Program Advisory Committee
- Consider and advise on the overall Program

Working Groups (WG) in each category
- Consideration/advice on verification methods

Technology Verification Committee
- Consider and advise on verification testing

Ministry of the Environment
- Program management
- Develop protocol for each category
- Invitation/selection of Verification Organizations
- Distribution of logo

Nat'l Inst. for Env. Studies
- Technology development for verification testing methodologies

Database management body
(Environmental Information Center)
- Website operations/maintenance on verification testing results, etc.

Verification Organization
(Local gov'ts, public corporations, etc.)
- Invitation/selection of target technologies
- Verification testing
- Publishing of verification testing reports

Applicants for verification
(Tech. developers, vendors, etc.)
- Apply to Verification Organization
- Allowed to use logo

Support for verification

Distribution of logo (Planned for after summer 2005)

Actual verification projects

Guidance, advice

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II. Outline of Program
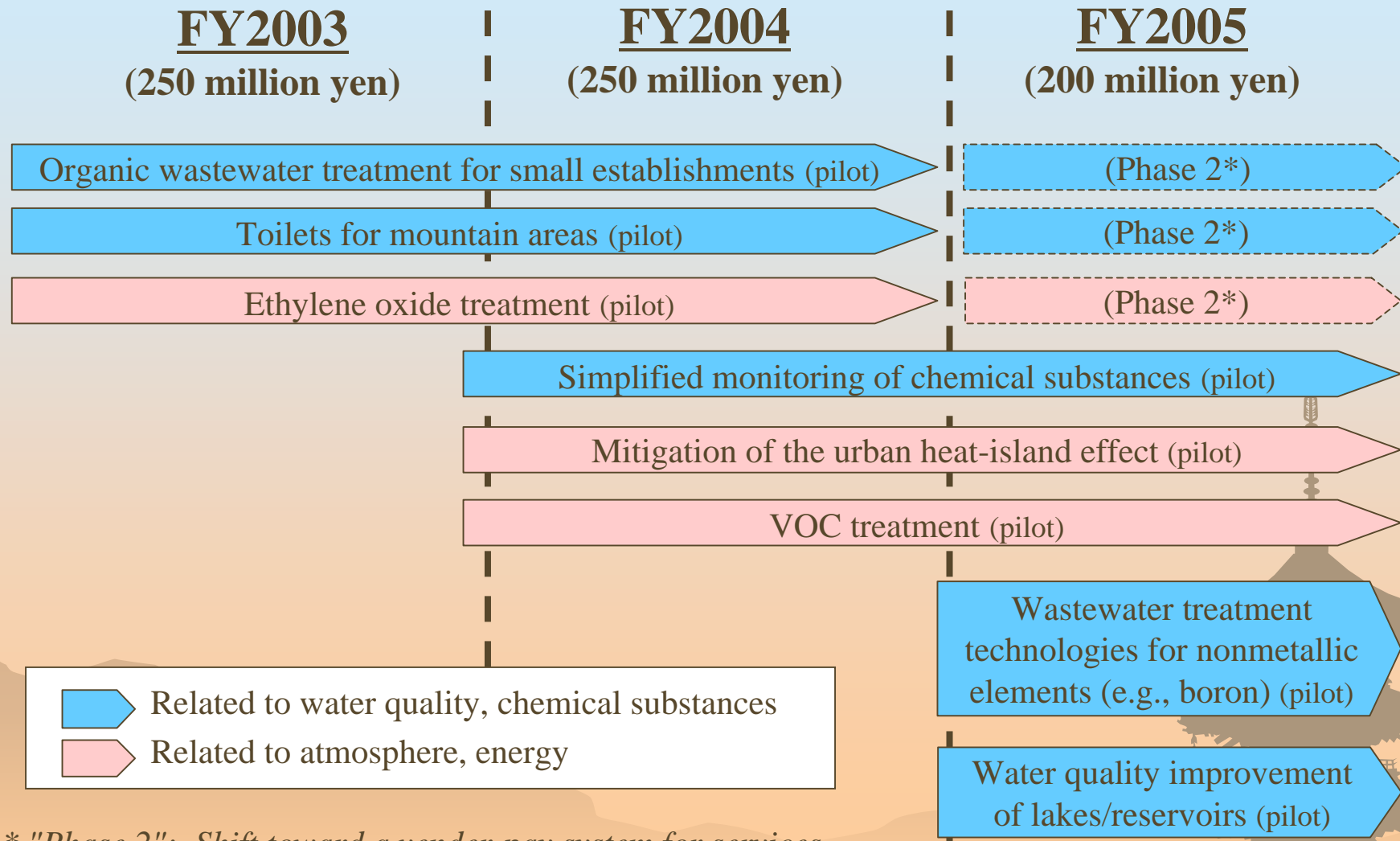
II-2. Approach for selection of technology categories

- During the pilot period, representative environmental technology categories will be selected for which (1) there is a particularly high need at the level of government environmental authorities, and (2) users and vendors have a high need for tech. verification.
  - Needs of environmental administration: Technologies related to major environmental challenges in Japan, and for which the need exists to find ways to encourage the diffusion of those technologies
  - Need for verification: Technologies for which many companies are requesting verification

- At present, this program does not cover the following areas (covered under other programs in/out of MOE):
  - Technologies related to global warming countermeasures
  - Equipment to reduce vehicle emissions
  - Technologies related to waste countermeasures
  - Installing greenery on walls and roofs, etc.

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II. Outline of Program

II-3. Technology categories and budget size

FY2003	FY2004	FY2005
(250 million yen)	(250 million yen)	(200 million yen)

Organic wastewater treatment for small establishments (pilot) → (Phase 2*)

Toilets for mountain areas (pilot) → (Phase 2*)

Ethylene oxide treatment (pilot) → (Phase 2*)

Simplified monitoring of chemical substances (pilot)

Mitigation of the urban heat-island effect (pilot)

VOC treatment (pilot)

Wastewater treatment technologies for nonmetallic elements (e.g., boron) (pilot)

Water quality improvement of lakes/reservoirs (pilot)

Related to water quality, chemical substances

Related to atmosphere, energy

*"Phase 2": Shift toward a vender-pay system for services.

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II. Outline of Program

II-4. Project flow in each category

- Selection of target technology category will be only in the 1st year. From the 2nd year on, yearly cycle including publication by database of each technology field. (Test protocol will be revised each year.)

- In principle, each verification test will end within the year (with some exceptions).

- For now, applications for Verification Organizations and target technologies are invited each fiscal year.

Project Flow	Implementation Bodies
Selection of technology categories	MOE / ETV Pilot Program Advisory Committee
Formulation of protocol for verification testing	MOE / WG for each Tech. Category
Invitation/selection of Verification Organizations	MOE / WG for each Tech. Category
Invitation/selection of target technologies	Verification Organizations Tech. Verification Committee
verification testing	Verification Organizations
Verification testing Report writing	Verification Organizations Tech. Verification Committee
Database Registration/publication	MOE / Database operations body

Yearly cycle

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II.Outline of the Program

II-5. Annual Tech. Categories/Verification Organizations/No. of Technologies Verified

FY2003

Ethylene oxide treatment (6)
• Tokyo Metro. (6)

Organic wastewater treatment for small scale Establishmt.(8)
• Ishikawa Pref.(2)
• Hiroshima Pref.(2)
• Osaka Pref.(4)

Toilets for mountain areas (2)
• Toyama Pref.(2)

Begun in 2003

3 categories 5 bodies
(16 technologies)

FY2004

EO treatment(2)
• Tokyo Metro.(2)

Mountain toilet(4)
• Nagano Pref.(1)
• Shizuoka Pref.(1)
• Kanagawa Pref.(1)
• Mountain ECHO (NPO) (1)

Organic wastewater treatment(10)
• Fukushima Pref.(1)
• Saitama Pref.(2)
• Hiroshima Pref.(3)
• Osaka Pref.(2)
• Kagawa Pref.(2)

Mitigation of the urban heat-island effect(4)
• Osaka Pref.(4)

Simplified monitoring of chemicals(8)
• Yamaguchi Pref.(4)
• Hyogo Pref.(2)
• Aichi Pref.(2)

VOC treatment(2)
• Tokyo Metro.(2)

Begun in 2004

6 categories 15 bodies
(30 technologies)

FY2005

EO treatment (-)
• (Suspended)

Mountain toilet (-)
• (Future invitation)

Organic wastewater treatment(-)
• (Future invitation)

Heat-island (-)
• Osaka Pref.(-)

VOC treatment(-)
• (Inviting)

Simplified monitoring of chemicals (-)
• (Inviting)

Wastewater treatment for nonmetallic elements(-)
• Chiba Pref. (inviting)

Water quality improvement in lakes/reservoirs (-)
• Saitama Pref.(inviting)
• Osaka Pref.(inviting)
• Hiroshima Pref.(inviting)
• Kagawa Pref.(inviting)
• Ehime Pref.(inviting)

Begun in 2005

8 categories? Bodies
(? technologies)

9

Note: Figures in parentheses are number of technologies being verified.
Red indicates organizations participating for two or more times.

III. Example of Tech. Category
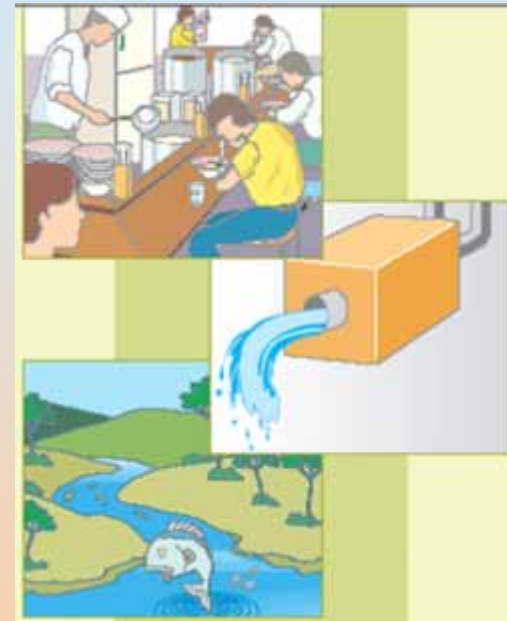## ~ Small-Scale Organic Wastewater Treatment ~

(Need)

(1) Water quality has not been adequately improved:

BOD/COD concentrations have been improving, but in FY2003 achievement rate of Water Quality Standard were still at 87.4% (rivers), 55.2% (lakes/reservoirs), 76.2% (seawater).(Similar problem with T-N, T-P.)

(2) Many unregulated emissions sources:

Small establishments (effluent < 50 m^3/day) are not subject to effluent standards for organic pollutants. But number of these small-scale ones account for about 87% of all establishments.

→ To reduce the organic pollutant load, need to promote organic wastewater treatment technologies that are low-cost, compact, and low-maintenance.

An image from the cover of FY2003 report

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III. Example of Tech. Category
~ Small-Scale Organic Wastewater Treatment ~

Target technologies in FY2003 project

Verification Organization	Technology developers	Name of technologies
Ishikawa Pref.	Ams Corporation	Treatment equipment for oily wastewater, using oil-decomposing bacteria
	Gate, Ltd.	Treatment technologies for wastewater containing oil, using oil-decomposing microbial agents
Environmental Pollution Control Center, Osaka Pref.	Kondoh-FRP Co., Ltd.	Fixed-bed oil-decomposing bacteria adsorption type Contact aeration method
	Suiko Engineering, Co., Ltd.	Enzyme reaction/fluidized bed type Contact aeration method
	BioRangers, Inc.	Multi-microbe/tornado-type bio-reactor system
	River SS., Ltd.	Coagulation reaction/electrolytic flotation separation
Hiroshima Pref.	Aquamake, Co.,Ltd.	Restaurant/kitchen wastewater treatment equipment "Super Aqua"
	Kowa Emtech Limited	"Zero Combo" (oil-recovery equipment for kitchen wastewater treatment)

Note1: Names of Developer and Technologies may not be accurate.
2: FY2004 report is currently being prepared.

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III. Example of Tech. Category
~ Small-Scale Organic Wastewater Treatment ~

Developer	Main Purpose of Technology	Pollutants Removed			
		BOD	COD	SS	n-Hex
Ams Corporation	Treatment of organic wastewater	X	X	X	X
Gate, Ltd.	Grease trap oil decomposition				X
Kondoh FRP Co., Ltd.	Treatments of organic wastewater	X		X	X
Suiko Engineering, Co., Ltd.	Treatments of organic wastewater	X		X	X
BioRangers, Inc.	Treatments of organic wastewater	X		X	X
River SS., Ltd.	Treatment of organic wastewater				X
Aquamake, Co.,Ltd.	Treatments of organic wastewater	X	X	X	X
Kowa Emtech Limited	Decomposition of grease trap oil, etc.				X

● For the each technology, the actual pollutant removal was confirmed to generally match the technology's stated specifications. (Although some technologies failed to achieve their stated specifications.)

● In some cases, the technology was confirmed to also remove some pollutants that were not being targeted (even T-N or T-P in some technologies).

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III. Example of Tech. Category
Sample Verification Report (Summary Version)

1st page
Technology Outline
- Technology name
- Technology flowchart
- Location of test
- Technical specifications, etc.

3rd page
Verification results 2
- Environmental Impact (sludge generated, etc.)
- Resources used (electricity, chemicals, etc.)
- Maintenance features

2nd page
Verification results 1
- Pollutant removal performance

4th page
Applicant info.
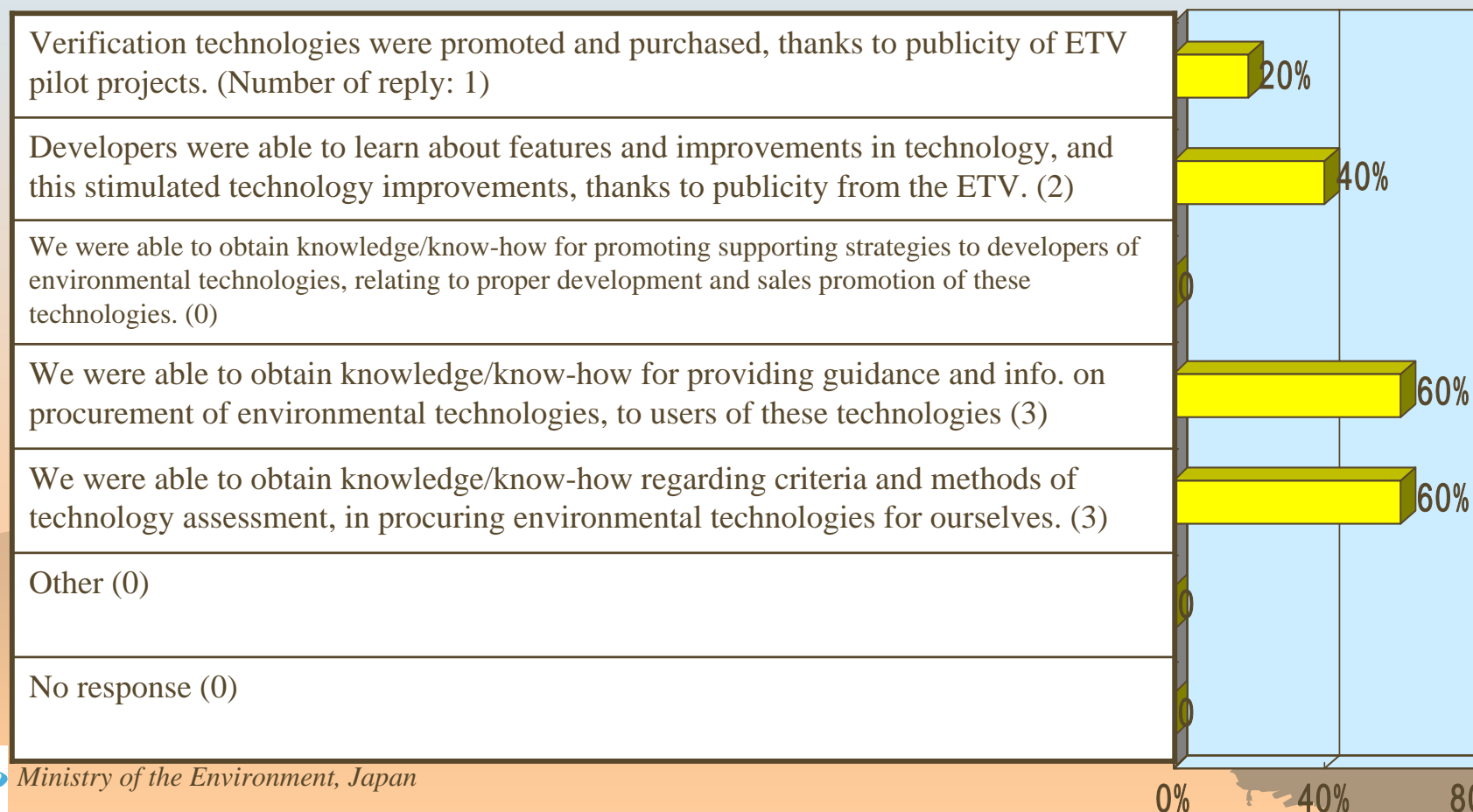- Product data
- Contact info., etc.

IV. Impacts of Verification

~ Findings from Questionnaire survey of FY2003 Projects ~

1. Samples from survey of participating Verification Organizations (1)

(Sent: 5 organizations. Replies:5 organizations)

Question: What were the specific outcome of your organization becoming a Verification Organization (by implementing the project)? (Multiple responses permitted.)

Outcome	Percentage
Verification technologies were promoted and purchased, thanks to publicity of ETV pilot projects. (Number of reply: 1)	20%
Developers were able to learn about features and improvements in technology, and this stimulated technology improvements, thanks to publicity from the ETV. (2)	40%
We were able to obtain knowledge/know-how for promoting supporting strategies to developers of environmental technologies, relating to proper development and sales promotion of these technologies. (0)	0
We were able to obtain knowledge/know-how for providing guidance and info. on procurement of environmental technologies, to users of these technologies (3)	60%
We were able to obtain knowledge/know-how regarding criteria and methods of technology assessment, in procuring environmental technologies for ourselves. (3)	60%
Other (0)	0
No response (0)	0

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IV. Impacts of Verification

1. Samples from survey of participating Verification Organizations (2)
        (Sent: 5 organizations. Replies:5 organizations)

Question: What were the specific outcome of your organization becoming a Verification
        Organization (by implementing the project)? (Multiple responses permitted.)
        (Continued.)

Examples of free responses :
- "We were able also to obtain data useful for us to provide governmental guidance
  to industry."
- "By dialogue with developers on issues such as analytical results and equipment
  maintenance, both sides were able to gain new knowledge."
- "This activity provided us useful experience for considering conducting an
  independent verification projects in the future."

Note1: All the Verification Organizations were local governments in FY2003 project.
     2: Responses were collected at Sep.-Oct. of 2004.
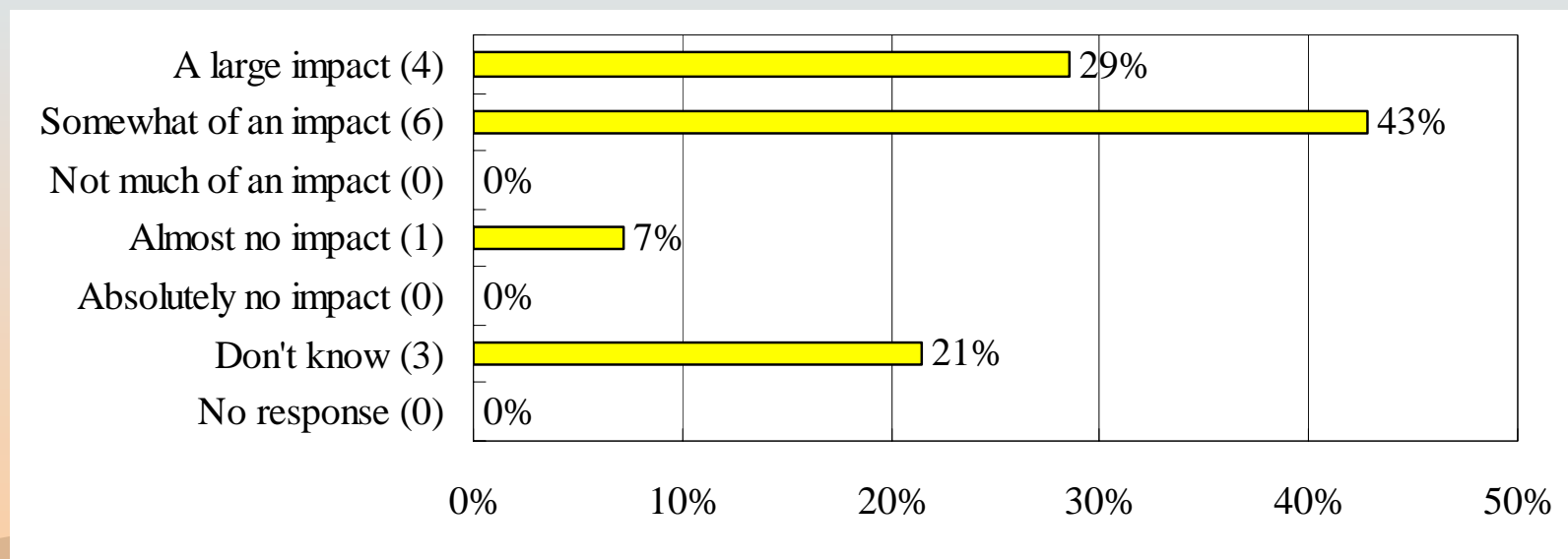
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IV. Impacts of Verification

2. Samples from survey of participating companies
(Sent:16 companies. Replies: 14companies)

Question: What was impact on your company's overall activities (sales, technology development, etc.) by conducting verification in the project? (Choose one.)

Examples of free responses:
- "This project helped our sales development."
- "We experienced an increase in inquiries from customers and various facilities."

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V. Future Topics

(1) Enhancing the Benefits of Verification

- Introduce verification logo
  - A decision will be made from among 5 concepts shown here. Deadline for voting by Internet was 6/22.
  - Use of the logo will be permitted for verified technologies, under conditions similar to those used in the U.S. (i.e., logo does not imply certification or approval; unauthorized use is prohibited).
- Publication of verification results on program websites (after completing the process)
- Awareness-raising by symposiums, etc. (will start in FY2006)
- Other approaches: For each tech. category, some other ways will be sought to stimulate demand for utilization of verified technologies.
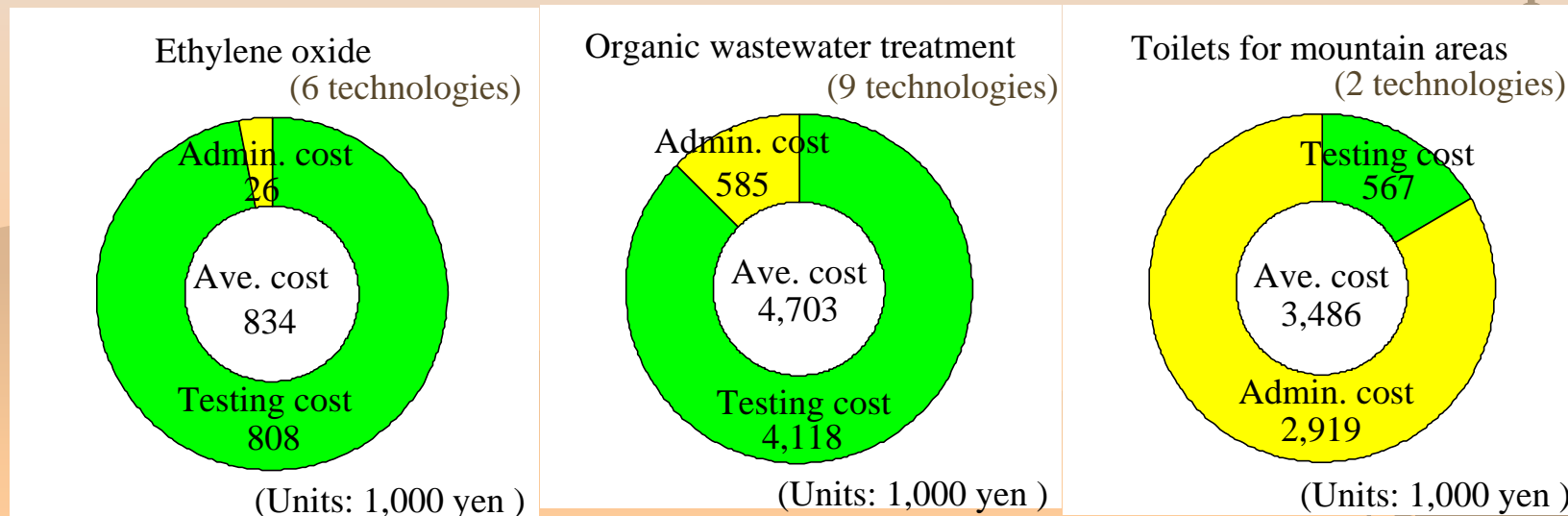
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V. Future Topics

* For tech. categories that have established verification methodologies after pilot period ends (after 3rd years from the beginning), will shift to a vender-pay, fee-based system.

* How to set fees: In principle, fees will cover actual costs of verification testing. Cost of equipment installation/removal to be covered by the applicant.

* Future issues: In some cases, the cost may be too high for small/medium enterprises. (E.g.: Costs of installation/removal of toilets in mountain areas, could be prohibitive at high elevations. For organic wastewater treatment, testing costs themselves are relatively high). Support for SMEs is now under consideration.

Average cost in 3 tech. categories in FY2003 (average per technology)

Ethylene oxide
(6 technologies)

Admin. cost
26

Ave. cost
834

Testing cost
808

(Units: 1,000 yen)

Organic wastewater treatment
(9 technologies)

Admin. cost
585

Ave. cost
4,703

Testing cost
4,118

(Units: 1,000 yen)

Toilets for mountain areas
(2 technologies)

Testing cost
567

Ave. cost
3,486

Admin. cost
2,919

(Units: 1,000 yen)

V. Future Topics

(3) Issues for Implementation Structure

- The scope of technology categories are narrow, and there are too many Working Groups (7 as of June 2005). There are even more Verification Committees (about same number as Verification Organizations: 13 in FY2004*).

- For technology categories for which verification demand has declined (i.e., fewer applicants to the program), termination (suspension) will be considered.

- "Repeater" organizations (Verification Organizations that come back after first experience) are increasing. Is it still necessary to continue calling for applicants each year?

- It may be necessary to streamline the overall program structure in the future.

Total is 15 in FY2004, but 3 organizations have set up a joint committee.

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V. Future Topics

(4) Technology categories added in FY2006

* Planning to study corporate demand for verification again in summer 2005.
* Will consider next technology categories based on these findings.

(5) Expanding program after pilot period ends

* Pilot period will end in FY2008, followed by full program implementation. Issue to consider:
  – Expand target technologies for verification in the future? (If so, it will be even more important to streamline overall operations.)
  – How to address the problem of disparities between regions in verification activity? (If small Verification Organizations are unevenly distributed, it will be difficult for companies in other regions to apply for verification.)

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Thank you!

J-ETV Website (English)
http://etv-j.eic.or.jp/en/index.html

http://etv-j.eic.or.jp/index.html
(Japanese)

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Appendix: Guidance/Advisory Structure
(1)Overall Structure

ETV Pilot Program Advisory Committee
- Consider and advise on the overall Model Project

- Academia: 8 persons (incl. Chair)
- Industry: 3 persons
- Local governments: 3 persons
- NPOs: 1 person

WG in each tech. category
- Consider and advise on verification methods

WG	Ethylene oxide	Organic	Mountains	Chemistry	Heat island	VOCs	Boron	Lakes
Experts	2	2	2	2	3	3	1	3
Industry		2	2		1	2	1	
Local gov't.	1	1	1	2	1	1	1	2
Other*	2		2	2	1	2	2	

* Other: Public research institutes, public corporations; non-profits, etc.

Appendix: Members of Guidance/Advisory Structure

(2) ETV Pilot Program Advisory Committee

Name	Affiliation	Note
Koji Arizono	Professor, Prefectural University of Kumamoto	Chair, Working Group on Simplified Monitoring of Chemical Substances
Kozo Ishida	Chairman, Japan Environmental Technology Association	
Mitsumasa Okada	Executive Vice President, Hiroshima University	Chair, Working Group on Water Quality Improvement of Lakes/Reservoirs
Shinji Kakinuma	Chairman, Tokyo Metropolitan Small Business Promotion Agency	
Koichiro Kishikawa	Director, Kanagawa Environmental Counselors Association Nonprofit Organization	
Mitsumasa Kimura	Director, Social Affairs Department, Fukushima Prefectural Government	
Yasuo Kobayashi	Chairman of Planning Committee, The Japan Society of Industrial Machinery Manufacturers, Environment Equipment Department	
Kazuhiko Sakamoto	Professor, Saitama University	Chair, Working Group on Ethylene Oxide Chair, Working Group on VOCs
Satoru Sadohara	Professor, Yokohama National University	Chair, Working Group on Heat Island Effect
Takeshi Hasegawa	Director, Tokyo Metropolitan Research Institute for Environmental Protection	
Masanori Fujita	President, Kochi National College of Technology	Chair, Working Group on Organic Wastewater Chair, Working Group on Boron in Wastewater
Takashi Matsumura	Principal Research Coordinator, National Institute for Environmental Studies	
Yasunori Murai	Director General, Environmental Pollution Control Center, Osaka Prefecturural Government	
Akira Moritake	Professor, Kanagawa Institute of Technology	Chair, Working Group on Mountain Toilets
Itaru Yasui	Vice-Rector, United Nations University	Chair, New Advisory Committee

Appendix: Findings of Survey of Needs for Tech. Verification (1)
Conducted Mar. & Oct. 2003

1. Tech. category that is currently conducted in the Program

Tech. Field Covered in Survey	Mar. + Oct. Total (Parentheses: No. Requests from Manufacturers)	Name of Technology category currently conducted
Ethylene oxide gas treatment technologies	4 (3)	Ethylene oxide treatment
Water quality end-of-pipe technologies	12 (10)	Small-scale organic wastewater treatment
		Boron Wastewater treatment
Environmentally-friendly human waste treatment technologies	105 (32)	Mountain toilets
Simplified atmospheric measuring technologies (excluding dioxins)	5 (3)	Simplified chemicals monitoring
Simplified water quality (and other substance) measurement technologies (excluding dioxins)	7 (6)	
Simplified measurement technologies for chemical substances	3 (2)	
Technologies of countermeasures for the urban heat island effect (excluding wall/rooftop greenery)	5 (4)	Heat-island mitigation
Technologies of countermeasures dichloromethane	1 (1)	VOC Treatment
Technologies for treatment (re-use) of used solvents	2 (2)	
Technologies for water quality improvement of lakes/reservoirs	12 (9)	Lakes and reservoirs

Appendix: Findings of Survey of Needs for Tech. Verification(2)
Conducted Mar. & Oct. 2003

2. Major technology fields with the greatest need for verification (excluding technologies already conducted in the Program)

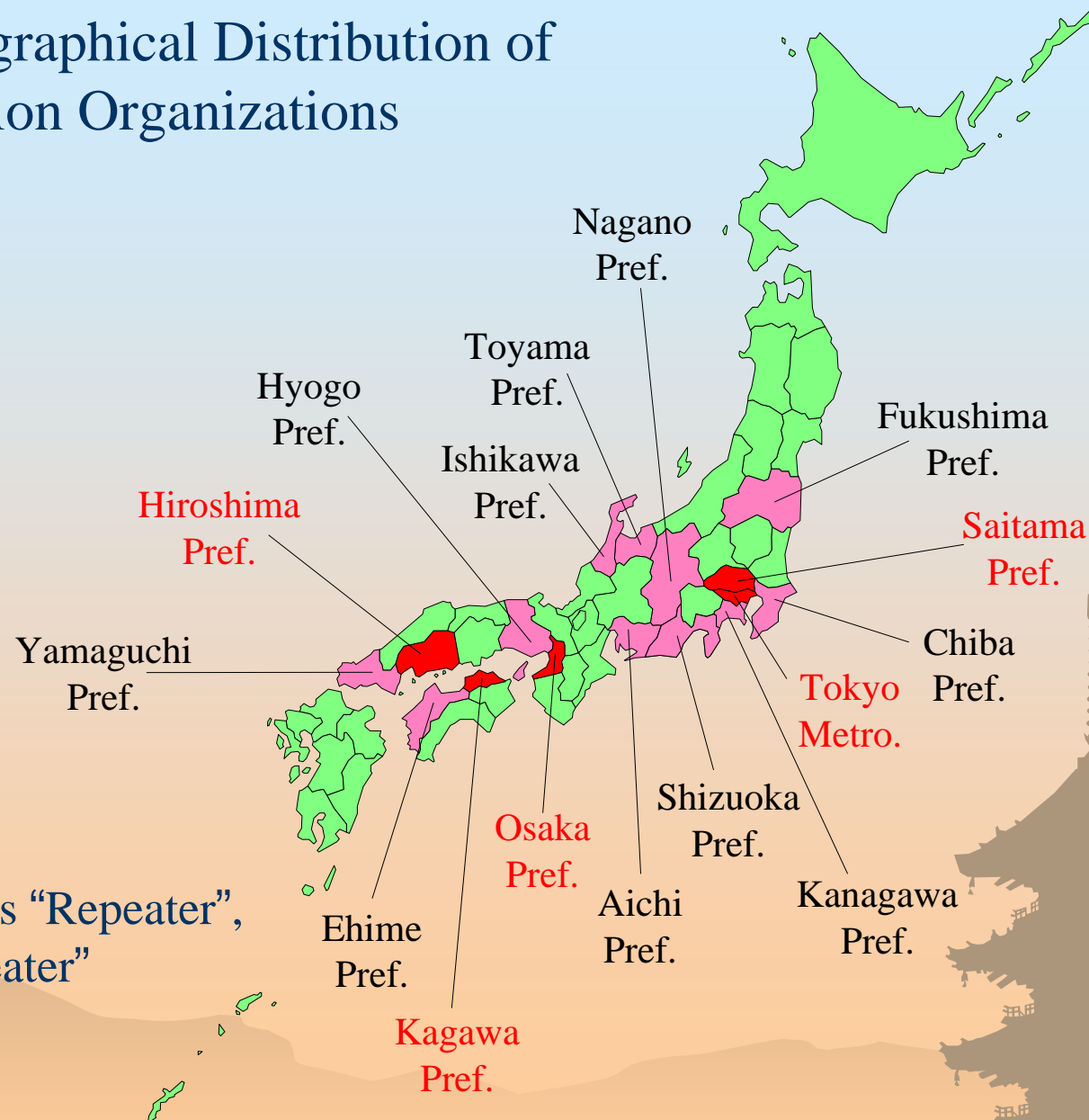| Tech. Field Covered in Survey	Mar. + Oct. Total (Parentheses: No. Requests from Manufacturers)
Treatment Technologies for organic waste (biomass resources)	24 (23)
Energy system technologies (excluding light- & wind-collecting equipment)	12 (8)
Treatment technologies for contaminated soil and groundwater	10 (7)
Greening technologies for walls/rooftops	9 (8)
Technologies for sludge treatment (re-use)	9 (5)
Technologies for waste plastic treatment (re-use)	5 (4)

Major reason for not being targeted by this program:
* Similar program already exists, supported by Ministry of the Environment or other ministry.

Note1: The survey was targeted environmental technology venders and users.
    2: Total respondents 322 (including 195 manufacturers)

Appendix: Geographical Distribution of Verification Organizations

Nagano Pref.

Toyama Pref.

Hyogo Pref.

Ishikawa Pref.

Fukushima Pref.

Hiroshima Pref.

Saitama Pref.

Yamaguchi Pref.

Chiba Pref.

Tokyo Metro.

Shizuoka Pref.

Osaka Pref.

Kanagawa Pref.

Aichi Pref.

Ehime Pref.

Note: **Red** indicates "Repeater", pink "non-repeater" Organizations.

Kagawa Pref.

Appendix: Technologies Applied For and Selected

FY2003

Technology	Verification Org.	No. Verified	No. Applications
Ethylene oxide treatment	Tokyo Metro.	6	10
	Subtotal	(6)	(10)
Organic wastewater treatment	Ishikawa Pref.	2	6
	Osaka Pref.	4	13
	Hiroshima Pref.	2	7
	Subtotal	(8)	(26)
Toilets for mountain areas	Toyama Pref.	2	8
	Subtotal	(2)	(8)
Total		16	44

FY2004

Technology	Verification Organization	No. Verified	No. Applications
Ethylene oxide treatment	Tokyo Metro.	2	3
	Subtotal	(2)	(3)
Organic wastewater treatment	Fukushima Pref.	1	3
	Saitama Pref.	2	5
	Osaka Pref.	2	4
	Hiroshima Pref.	3	5
	Kagawa Pref.	2	10
	Subtotal	(10)	(27)
Toilets for mountain areas	Nagano Pref.	1	9
	Shizuoka Pref.	1	2
	Kanagawa Pref.	1	1
	Mountain ECHO	1	5
	Subtotal	(4)	(17)
Simplified monitoring of chemical substances	Yamaguchi Pref.	4	-
	Hyogo Pref.	2	-
	Aichi Pref.	2	-
	Subtotal	(8)	(22)
Mitigation of the urban heat-island effect	Osaka Pref.	4	4
	Subtotal	(4)	(4)
VOC treatment	Tokyo Metro.	2	2
	Subtotal	(2)	(2)
Total		30	75

Appendix: Length of Verification Process (Days)
(Example from FY2003)

Project Flow

Selection of technology categories

▼

Formulation of protocol for verification testing

▼

Invitation/selection of Verification Organizations

▼

Invitation/selection of target technologies

▼

verification testing

▼

Verification testing Report writing

▼

Database Registration/publication

Ethylene oxide	Organic wastewater	Mount. Toilet	Average
57	43 days	44 days	48 days
36 days	22 days	31 days	29.66 days
49 days	35 days (45,33,27)	27 days	37 days
13.5 days/tech. (45,8,6,8,7,7)	79.25 days/tech. (76,84,92,92,80,35, 90,85)	357 days	149.91 days
112 days	101 days	197 days	136.66 days
Total 267.5 days	Total 280.25 days	Total 656 days	Total 401.25 days