MIC
Ministry of Internal Affairs and Communications

Japan's ICT & Climate Change Policies and Actions

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23 September, 2009

Ministry of Internal Affairs and Communications

Session 3: Reducing Environmental Impacts of ICTs. This session will examine ways to promote sustainable use of ICT products and services throughout their lifecycle, and the impact of policies on the use of ICTs to tackle climate change.

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I-1. Japan's Climate Policies and Actions (ICT-related Issues)

MIC Ministry of Internal Affairs and Communications

1. Action Plan for Achieving a Low-Carbon Society (Cabinet decision, July, 2008)

(Examples relating to ICT)

I. Japan's target
○ Reduce 60-80% of current emissions by 2050
○ Peak out world total emissions over the next 10-20 years

II. Technology Development and Diffusion
○ Promote innovative technology development

III. Framework to move towards a Low-Carbon Society
○ Start trial phase of domestic emissions trading
○ Visualize GHG emissions associated with many products, foods, and services

IV. Support for regional and citizens' initiatives
○ Urge changes in business styles and lifestyles
Promote the 3Rs (Reduce, Reuse, Recycle)

I-2. Japan's Climate Policies and Actions (ICT-related Issues)

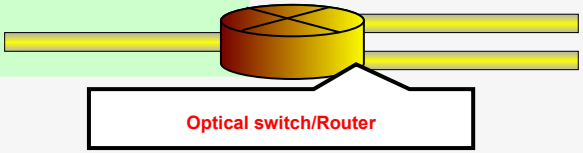
The Innovation for Green Economy and Society
(Minister of the Environment, April, 2009)

Innovation toward:
1. Green social capital
2. Green local community
3. Green consumption
4. Green investment
5. Green technology
6. Green Asia

ICT policies (1)
Eco-Point: Promote purchasing of energy-saving home appliances

ICT policies (2)
Promote green ICTs: Green iDCs, visualization of GHG emissions

ICT policies (3)
R&D: Optical router, HEMS, etc.



Japan's Medium-Term GHG Emission Reduction Target

O Japan's Post-Kyoto Protocol medium-term greenhouse gas emission reduction target

- Aso's announcement (10 June 2009)

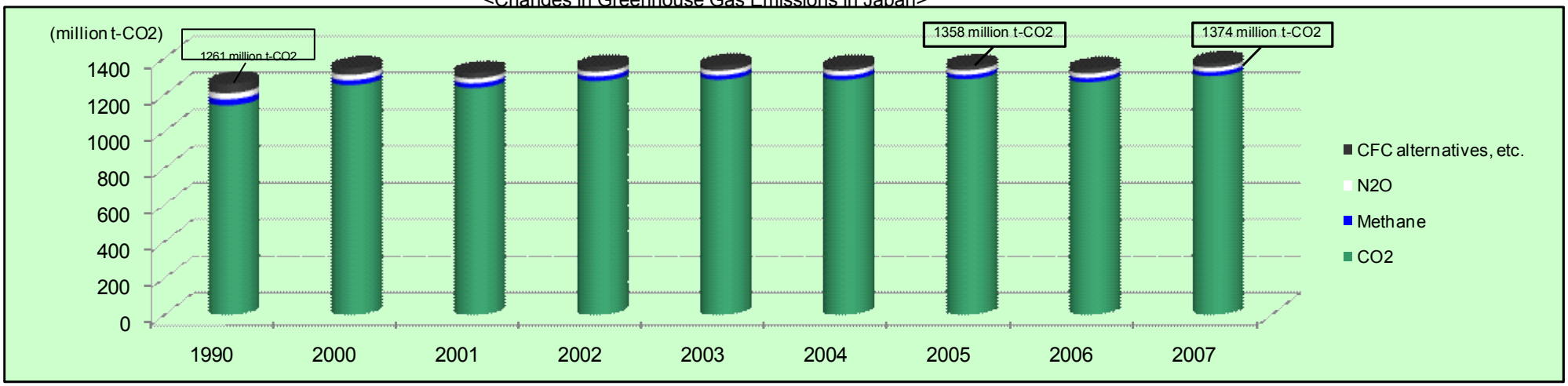
⇒ 8% emission cut by 2020 from1990 level

(15% emission cut by 2020 from 2005 level)

- Hatoyama's announcement (7 Sep 2009)

⇒ 25% emission cut by 2020 from1990 level

<Changes in Greenhouse Gas Emissions in Japan>

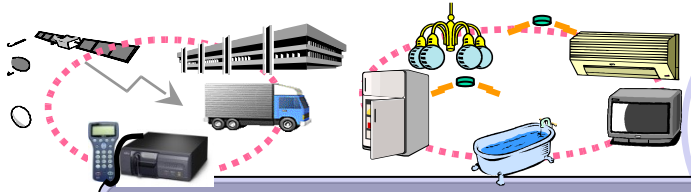


Global Warming Issues and ICT

- ICTs themselves produce CO_2 emissions due to consumption of electrical power to operate equipment/systems.
- On the other hand, ICT usage can contribute to a reduction in CO_2 emissions due to a marked improvement in the efficiency of production, consumption and business, also that of traffic alternatives, and a reduction in traffic volume.
- It is possible to make environmental measurements and predictions using ICT.

Improved energy efficiency

- ＩＴＳ (Intensive control of ETC, VICS, and traffic lights)
- BEMS (Building energy management system)
- HEMS (Household energy management system)



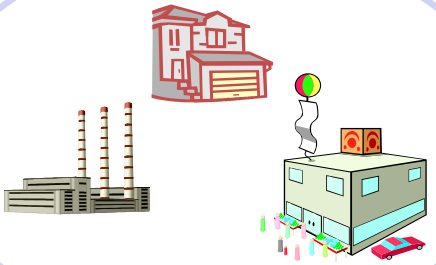
Reduced movement of people and products

- Online shopping, online trading
- Telework, TV conferencing
- Music, video, and software distribution
- e-applications (tax declarations, online receipts)

General households

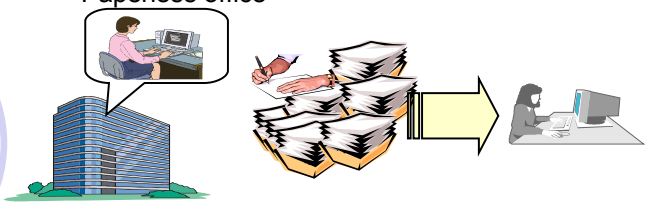
Production/ distribution/ transportation

Offices/s hops



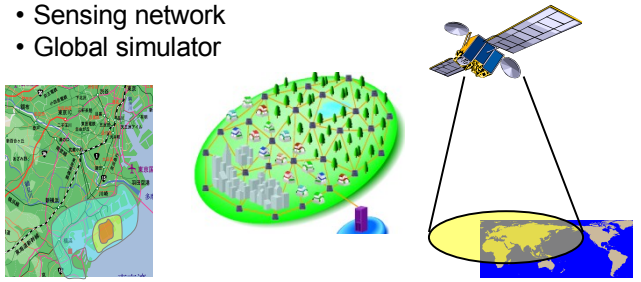
Improved efficiency of production and consumption

- Supply chain management
- e-publication and distribution
- Paperless office



Environmental measurements and predictions

- Radar for measuring CO_2
- Sensing network
- Global simulator



Use of ICT

Contribute to tackling global warming issues by promoting wider use of ICT

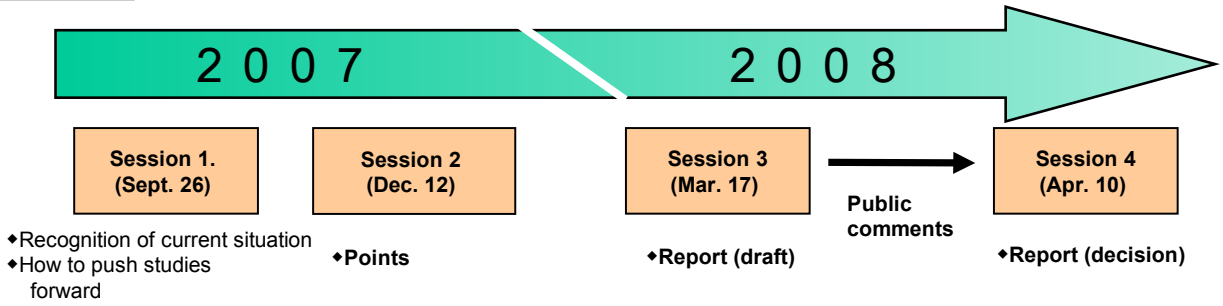
II-1 Study group on ICT policies to tackle global warming issues (1/5)

As global warming issues become ever more serious, the Ministry of Internal Affairs and Communications has set up a **"Study group on ICT policies to tackle global warming issues"** (Chairperson: Yoshio TSUKIO, Professor Emeritus at the University of Tokyo) in sep, 2007.
The group's purpose is to investigate how ICTs can have a positive impact in global warming issues.
The report was drawn up on 10 April, 2008.

1 Details

(1) Possible effects of reducing carbon dioxide emissions and power consumption in the area of ICTs.
(2) Possibility of further CO2 emission reduction through ICTs.
(3) Issues surrounding ICT research and development that contribute to carbon dioxide emission reductions.
(4) International contributions in the ICT field as a response to global warming.

2 Schedule



II-1 Study group on ICT policies to tackle global warming issues (2/5)

Method of Evaluation

Reduction in CO_2 emissions by utilizing ICTs = **Effects of reductions in CO_2 emissions due to ICTs** − **ICT CO_2 emissions**

Effects of reductions in CO_2 emissions due to ICTs

Efficiency improvements can be made in such areas as energy usage, product manufacture & consumption, and reduced movement of people and products by using the ICT system resulting in lower CO_2 emissions. Generally, the following eight effects are foreseen.

ICT CO_2 emissions

Examples include CO_2 emissions due to the consumption of resources and energy during manufacturing processes and installation of ICT equipment and networks, and that occur in the process of power consumption, disposal, and recycling .

<Effects of reductions in CO_2 emission due to use of ICTs>

Effect	Details
(1) Product consumption	By reducing product consumption (consumption of paper, etc.), CO_2 emissions related to goods production, waste and waste production can be reduced.
(2) Power consumption/energy consumption	By enhancing the efficiency of power and energy use to reduce consumption, CO_2 emissions related to power generation and power transmission can be reduced.
(3) Movement of people	By reducing the movement of people, CO_2 emissions and energy consumption required by means of transportation can be reduced.
(4) Movement of goods	By reducing movement of goods, CO_2 emissions and energy consumption required by means of transportation can be reduced.
(5) Improved efficiency of office space	By using office space efficiently, CO_2 emissions and power consumption by lighting and air-conditioning, etc., can be reduced.
(6) Storage of goods	By reducing storage space for goods, CO_2 emissions and power consumption by lighting and air-conditioning, etc., can be reduced.
(7) Improved work efficiency	By enhancing work efficiency, resource and energy consumption can be reduced, thus reducing CO_2 emissions.
(8) Wastes	By reducing waste emissions, energy consumption required by environmental preservation and waste disposal, etc., can be reduced, thus reducing CO_2 emissions.

II-1 Study group on ICT policies to tackle global warming issues (3/5)

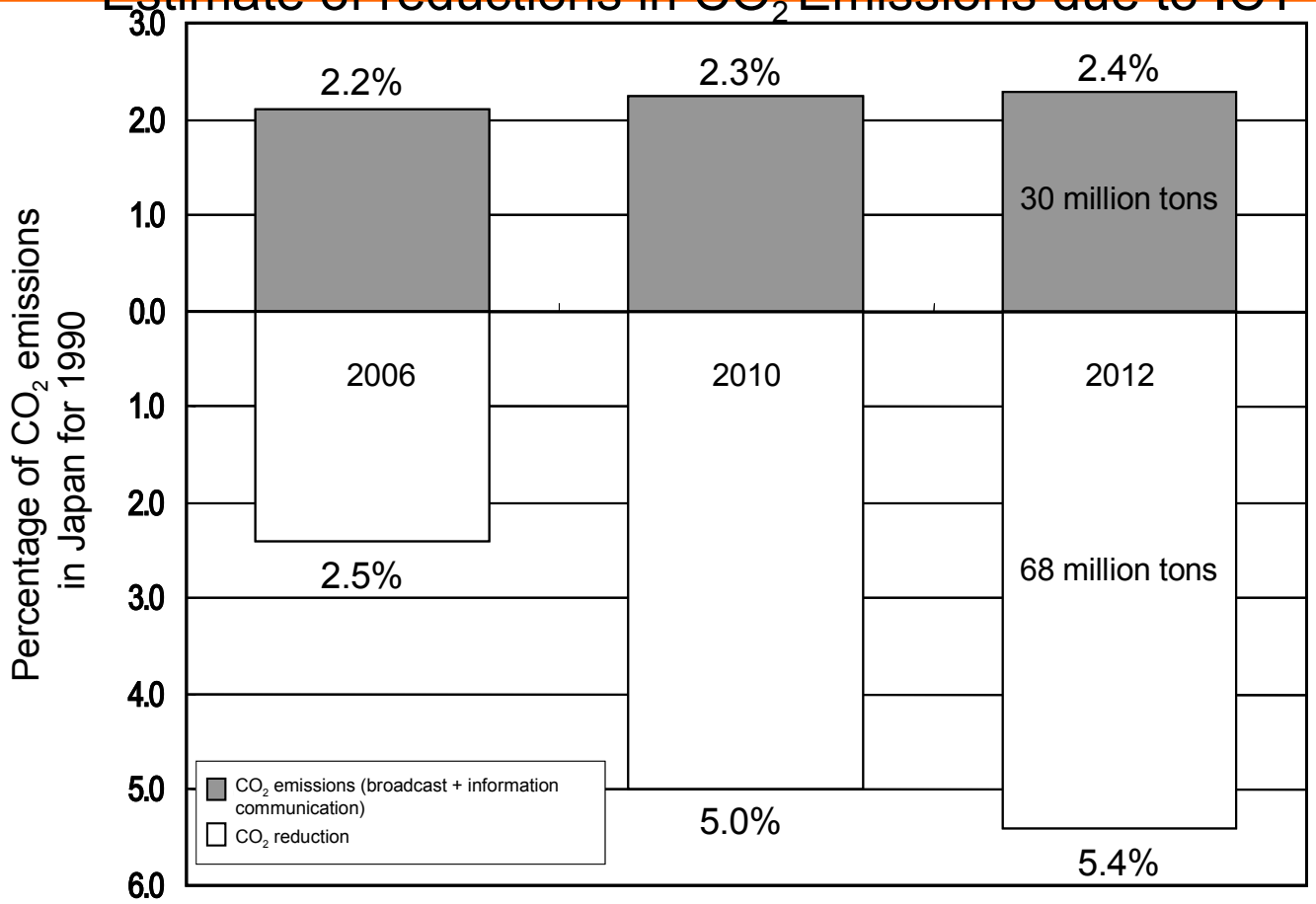
Estimate CO2 Emission Reduction due to Use of ICTs

Field	Cited areas of use	2006		2010		2012	
		10000t-CO_2	Percentage (%)	10000t-CO_2	Percentage (%)	10000t-CO_2	Percentage (%)
e-trade for individuals	Online shopping	198	0.1%	542	0.4%	712	0.5%
	Online air ticket issuing	2	0.0%	5	0.0%	6	0.0%
	Purchase of tickets at convenience stores	31	0.0%	60	0.0%	64	0.0%
	Installation of automatic cash dispensers	261	0.2%	291	0.2%	319	0.2%
e-trade for corporate business	Online transactions	527	0.4%	767	0.6%	836	0.6%
	Supply chain management	532	0.4%	1,839	1.4%	1,839	1.4%
	Recycle market	577	0.4%	1,154	0.8%	1,197	0.9%
e-digitization of substances	Music content	35	0.0%	114	0.1%	133	0.1%
	Visual content	15	0.0%	21	0.0%	25	0.0%
	PC software	11	0.0%	53	0.0%	61	0.0%
	Newspapers and books	4	0.0%	91	0.1%	95	0.1%
Movement of people	Telework	30	0.0%	50	0.0%	63	0.0%
	TV conferences	105	0.1%	194	0.1%	305	0.2%
	Remote control	5	0.0%	5	0.0%	5	0.0%
Advanced road traffic systems	ITS	308	0.2%	370	0.3%	401	0.3%
e-government and e-municipalities	e-tenders	0	0.0%	2	0.0%	2	0.0%
	e-applications (tax filing)	0	0.0%	8	0.0%	8	0.0%
	e-applications (online receipts)	0	0.0%	1	0.0%	1	0.0%
Energy control	BEMS, HEMS	468	0.3%	730	0.5%	730	0.5%
Total		3,110	2.3%	6,297	4.6%	6,802	5.0%

Note) Percentage is a percentage of total greenhouse gas emissions in Japan for 2005

II-1 Study group on ICT policies to tackle global warming issues (4/5)

Estimate of reductions in CO_2 Emissions due to ICT - Results



After subtracting, there is a contribution to CO_2 emission reduction of 3.0%

In 2012, 30 million tons of CO_2 are expected to be emitted in the ICT field, but the use of ICT will produce CO_2 reduction effects of 68 million tons, contributing to a CO_2 emission reduction of 38 million tons (equivalent to 3.0% of 1990 CO_2 emissions in Japan)

* This calculation includes “reduction potentials” which do not appear immediately, and efforts are required to realize these potentials.

II-1 Study group on ICT policies to tackle global warming issues (5/5)

Recommendations

(1) Widely promote the concept, “ICTs can significantly contribute to reducing global warming while at the same time pursing economic growth and improved convenience”, both inside and outside Japan.

(2) Consider a low-carbon society, by encouraging introduction of more ICTs for various social systems, and encouraging better penetration in social systems where ICTs have already been introduced such as e-government and e-municipalities. In addition, construct low-carbon city models which can easily make full use of ICTs.

(3) Devise evaluation methods to estimate the effects of reduction in CO_2 emissions due to use of ICTs at the international level, and promote standardization.

(4) Establish mechanisms which can apply these evaluation methods to private companies’ energy reduction efforts. Also, study the possibility of applying them to CDM (Clean Development Mechanism).

(5) Promote environment-conscious measures at Data Centers, and ASP/SaaS. For archiving of data, promote measures to reduce CO_2 emissions in information management by such means as changing storage methods to those that consume little power, such as optical disks, etc.

(6) Review environment-conscious corporate efforts that use ICTs, and support measures for promoting “visibility”, etc,, in the household.

(7) Promote dissemination of ICTs throughout society by providing information on cases where the environmental impact has been reduced using ICTs as best practices, and starting an award system, etc.

(8) Promote research and development of an “eco-energy management system” for managing power consumption and supply by digitization of energy flow, a “resource-saving system” for realizing a paperless society, “energy-saving ICT equipment and networks”, and “measurement of environmental information”, etc.

(9) Promote research and development of technical elements common to all of the above systems, and technical elements in the ICT field.

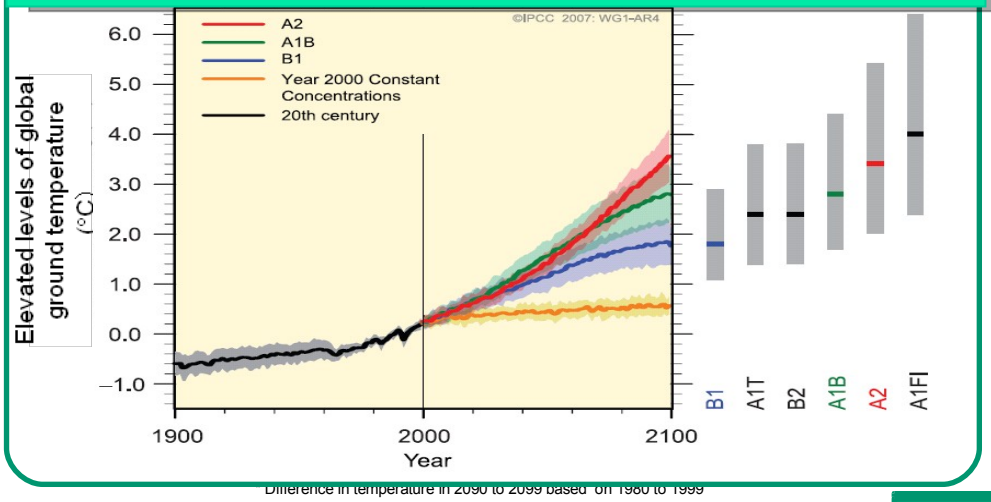
II-2. Study Group on Ecological Issues in the ICT Field (1/5)

Study Period: Nov.2008 – Jun. 2009

- Temperatures are predicted to increase by 0.2°C for each 10 year period during the coming 20 years.
- Global average ground temperature is predicted to increase by 1.8, to

Prediction of the increase in global average ground temperature

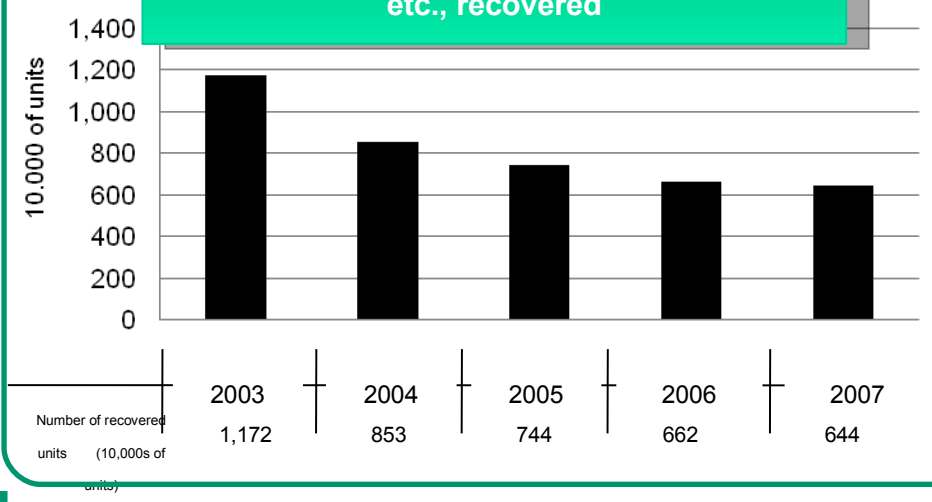
- comparison with the average between 1980 and 1999 -



Difference in temperature in 2090 to 2099 based on 1980 to 1999

- Voluntary measures to recycle mobile phones, etc., have been taken by the Mobile Recycle Network; but the number of handsets recovered in 2007 decreased to about 55% of that in 2003.

Changes in the number of mobile phones, etc., recovered



Meetings held in the Study Group on Ecological Issues in the ICT Field

- The following two matters are being studied to address ecological issues in the ICT field.

  (1) Promotion of energy-saving ICT devices and services.

  (2) Promotion of activities to reduce, reuse, and recycle (3R) mobile phone handsets

II-2. Study Group on Ecological Issues in the ICT Field (2/5)

Measures to Reduce CO_2 Emissions

(1) Approach by the private sector (consolidation of voluntary approaches)

(1) Promotion of voluntary action plan by ICT-related industries.

- Industrial associations that have not yet drawn up a plan should do so promptly.
- "Action Plans" with numerical targets should be drawn up by as many operators/carriers as possible to promote their activities.

(2) Guidelines specifying "evaluation criteria" should be drawn up by each industrial association (within FY2009) so that telecommunications carriers can formulate "procurement criteria" for devices and services based on CO2 emissions.

(3) Reduce emissions as a network system and promote broader use of green electric power (such as hydropower, wind power, and solar power generation).

(4) In order to visualize environmental activities, a mechanism is going to be introduced whereby telecommunications carriers evaluate their own activities and voluntarily display a "Conformity Mark" (within FY2009).

Image of evaluation criteria

Equipment	Formula for evaluation	Criteria	Device name	Value	Evaluation
Router	(Set the formula considering power consumption, transmission capacity, etc.)	☆☆☆ 16 ☆☆ 20 ☆ 24	▼▼ from Company XX	19	☆☆
			◆◆ from Company ○○	22	☆
			■■ from Company △△	15	☆☆☆
			●● from Company △△	25	

II-2. Study Group on Ecological Issues in the ICT Field (3/5)

Measures to Reduce CO_2 Emissions

(3) Approach by the Government

(1) Promote measures to reduce CO2 emissions.

- Promote a tax reduction scheme to promote investment in energy-saving facilities, etc. (2009-)
- Share the knowledge necessary to reduce CO2 emissions by the use of ICTs.

(2) Promote standardization of the evaluation method at ITU, etc.,, so that CO2 emissions reduced by ICT can be counted in total emission reductions.

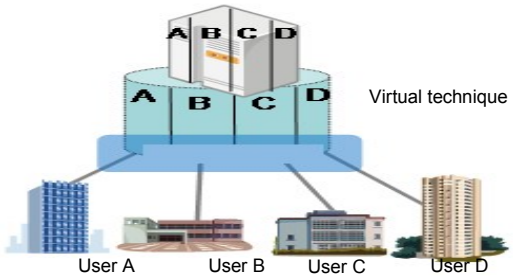
(3) Study the addition of network devices to the items specified by the Act on Green Purchasing.

(4) In order to save energy in networks, the government needs to promote R&D of the following:

- Deve
- Ener
- Ener
- Ener

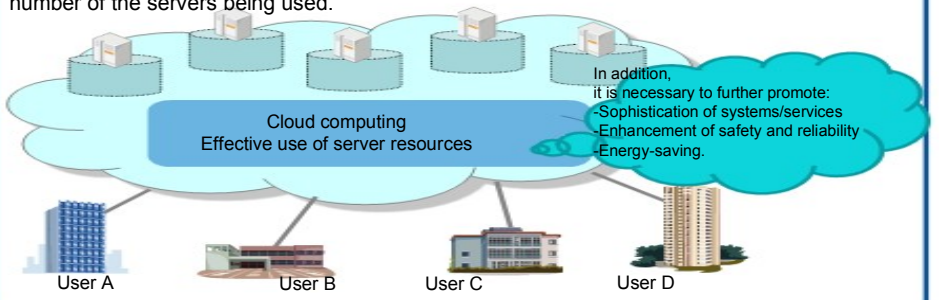
Virtual technique

-In the virtual technique, a single server is shared by two or more users, and each user can use it as if only the user occupied it.



Cloud computing

-In cloud computing, two or more users share two or more servers, and each user can use as many servers as required without being aware of the locations and number of the servers being used.



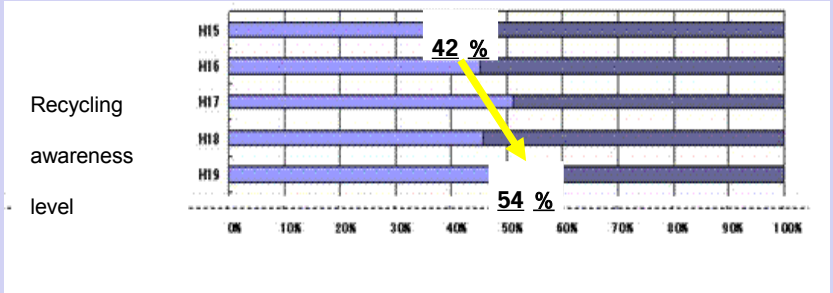
Direction of research and development in the future

-Using not only a virtual technique, but also cloud computing, industry, government, and academia should cooperate with each other to promote research and development, etc., aiming to make systems/service integration more sophisticated, enhance safety and reliability, and save energy, while attempting to use ICT resources more efficiently.

II-2. Study Group on Ecological Issues in the ICT Field (4/5)

Measures to Recycle Mobile Handsets

(1) Promotion of comprehensive recycling



➢ Set voluntary numerical targets

(a) Set a target awareness level for recycling. (Questionnaires are conducted every…)

Raise the awareness level to 70% by FY 2012 (Approx. 54% as of May 2008)

(b) Revise the target level for the material recycling rate.

Raise the recycling rate to 70% by FY 2012 (Existing numerical target level by MRN: 60%)

(c) Set a new target level for the recovery rate.

Set the target level for the recovery rate to 30%

together with the number of units recovered and their weight. (Estimate for 2008: 20%+)

➢ Further promote awareness.

(a) Promote awareness and PR campaigns by mobile communications carriers and municipalities

II-2. Study Group on Ecological Issues in the ICT Field (5/5)

Measures to Recycle Mobile Handsets

- Expand the range of locations for recovery of handsets
- Achieve smooth data transfer between handsets.
  - (a) Standardize data-saving methods, etc., and make users aware of how contents are transferred in a manner understandable to users.
  - (b) As for how to handle data under the Copyright Act, a study is required by the relevant ministries and agencies, and the relevant industrial associations, etc.
- Provide incentives to subscribers.
  - (a) It is desirable for each carrier to choose and conduct awareness and PR activities in a timely manner concerning point redemption, provide incentives such as discounts, and carry out recycling.
  - (b) It is inappropriate to introduce a deposit system (whereby a deposit is added to the price when a handset is sold and refunded when it is returned) at this time due to the problems of handset price increases, etc.

(2) Promotion of the Product/Abuse Approach

- It is necessary to promote environmentally conscious design, and downsizing of handset packages, etc.
- A second-hand product market is important; however, it is necessary to study measures to deal with issues, such as the distribution of stolen products and illegal modifications.
- It is also effective to reuse some parts in LCD displays. It will be appropriate for carriers

II-3(1/4). Measures taken by MIC (R&D) : Green Cloud Data Center Concept

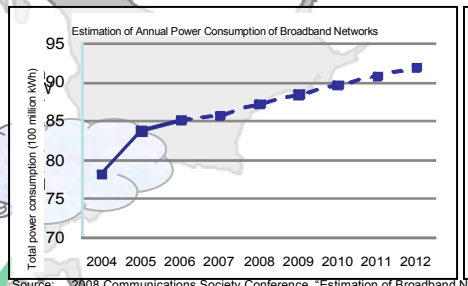
Promote construction of the most advanced large-scale data center. In this case, aim for the world's highest advanced technological performance, not only in the aspect of costs and the prevention of disasters such as earthquakes, but also in the environmental aspect, including cooling methods and the energy that will be used.

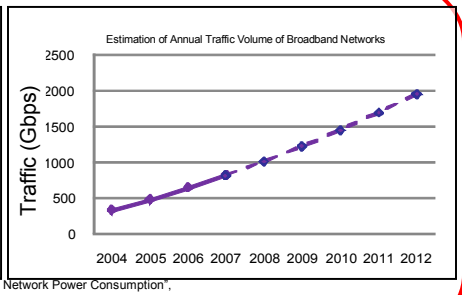
Measures to resolve the issue

Challenges

- **Increase in energy consumption and traffic volume of broadband networks**

  Increase in the number of devices such as servers due to the increase in data volume





Source: 2008 Communications Society Conference, "Estimation of Broadband Network Power Consumption", Institute of Electronics, Information and Communication Engineers

Concept of the Green Cloud Data Center with the highest environmental performance

Ex. 1: Clean energy data center

Utilization of areas where wind/solar power can be easily used

Significant reduction of CO2 emissions due to reduced usage of fossil-

Use of highly seismic-resistant robust ground

Ex. 2: Energy Efficient data center

High quality/low cost data center equipment

Power consumption reduced to half because of devices cooled by snow, ice, etc.

Use of networks, power supply, and highly seismic-resistant above-ground areas

Maintenance of personal information

Ensuring an innovative ICT environment

Information security

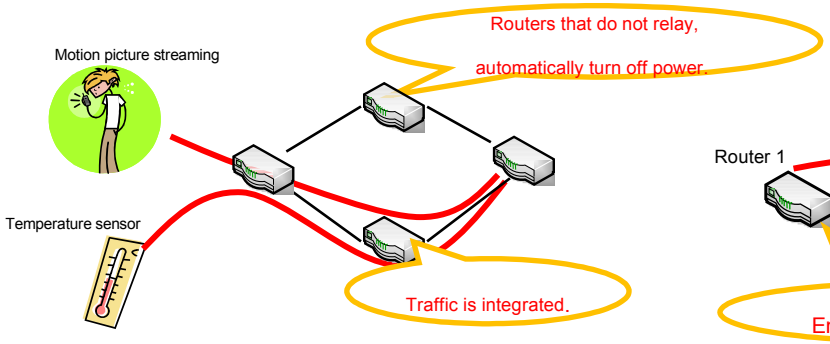
Internet

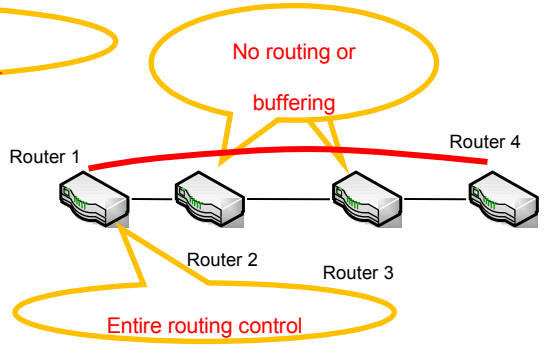
II-3(2/4). Measures taken by MIC (R&D): Ecological Internet and Networks

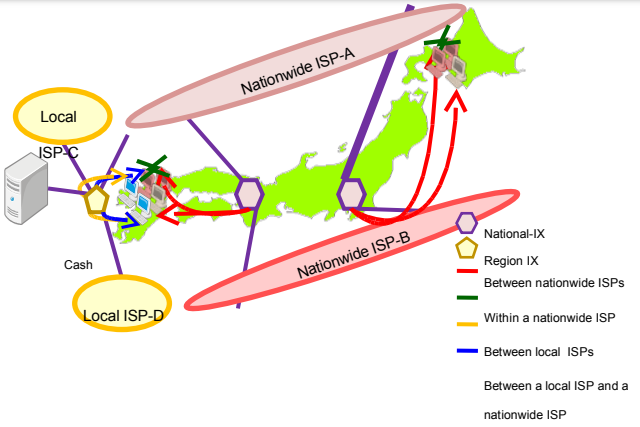
Ecological Internet

Develop and verify the technology to realize an ecological Internet that will save power and reduce CO2 emissions.

(1) Traffic integration/decentralization technology adapted to congestion, etc., in networks	(2) Power-saving network control technology using simplified routers	(3) Verification of traffic routing control utilizing network location information, etc.





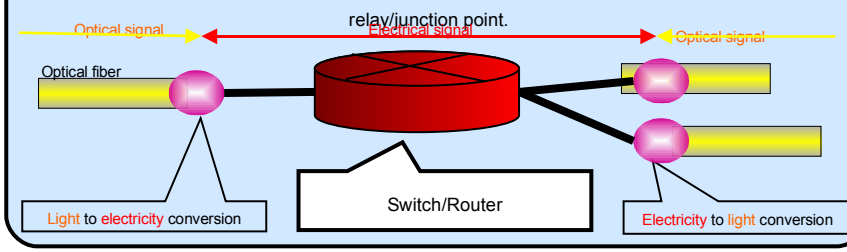


Research and development of all-optical communications technology

Accelerate research and development of all-optical communications technology that can realize both high speed and power-saving.

Existing network

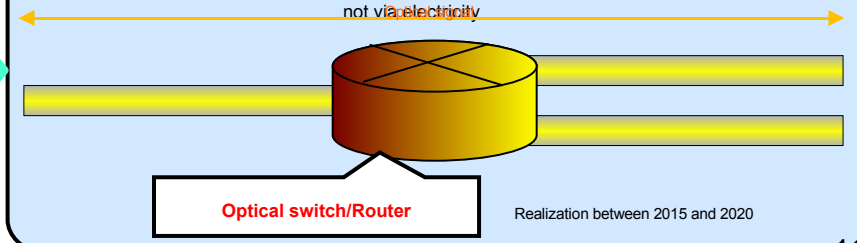
A signal is processed after conversion into an electrical one at each communications network relay/junction point.



Ultra-high speed
(100 to 1000 times)
Lower power consumption
(1/10)

All-optical network

Transmit information from one end of the communications network tio the other using only light, not via electricity



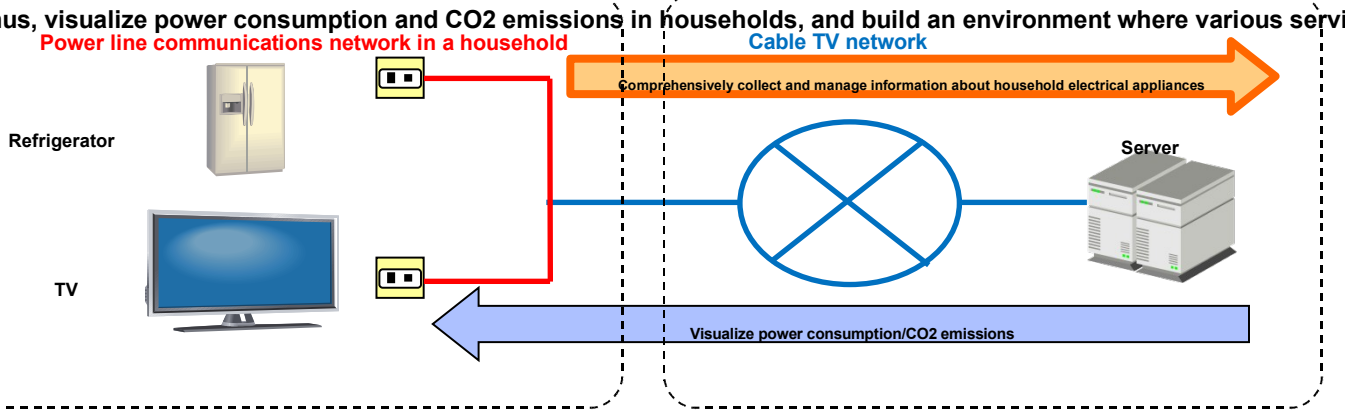
Realization between 2015 and 2020

II-3(3/4). Measurements done by MIC: Ubiquitous Special District

"Verification of household electrical appliance status monitoring services utilizing 'power line communications (PLC)'

○ Develop and verify technology that can comprehensively collect and manage information about household electrical appliances (model numbers, power consumption, etc.) of each household by connecting the power line communications network in the household and the cable TV network.

○ Thus, visualize power consumption and CO2 emissions in households, and build an environment where various services, including traceability, can be used.



○ Period: FY2008 to 2010

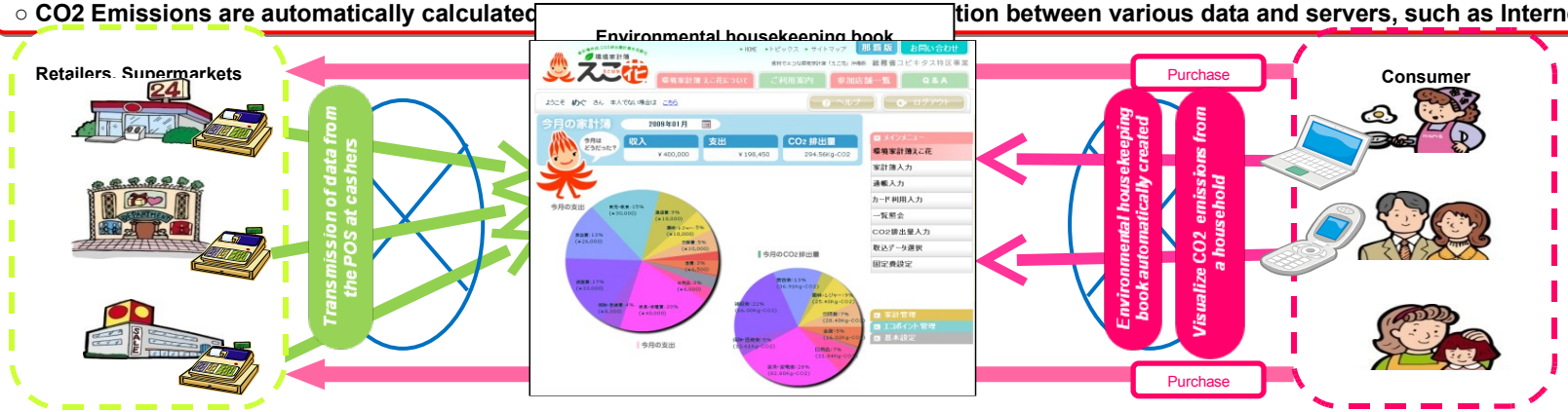
○ Place: Seika-cho, Kyoto Prefecture

PLC (Power Line Communications) : Technology to use power lines as communications circuits. High-speed communications at several Mbps are made possible by installing an adaptor for communications (PLC modem) at a wall outlet, and connecting a communications device.

"Environmental housekeeping book using ASP/SaaS"

○ Visualize CO2 emissions in a household using an "environmental housekeeping book with ASP/SaaS" that can automatically calculate CO2 emissions from purchasing/consumption in consumers' daily lives.

○ CO2 Emissions are automatically calculated [illegible]tion between various data and servers, such as Internet-based POS.



* Study the possibility of collaboration with the Eco Action Point Program of the Ministry of the Environment

○ Period: FY2008 to 2010

○ Place: Naha City, Okinawa Prefecture

II-3(4/4). Tax reduction to promote investment in energy-saving facilities, etc

(Purpose)

Realize both a low-carbon society and economic growth through support, based on the Act on Special Measures for Industrial Revitalization and Innovation in Industrial Activities, for facilities such as those that increase the productivity of resources (or increase added value with less energy and fewer resources.)

(Scope of support)

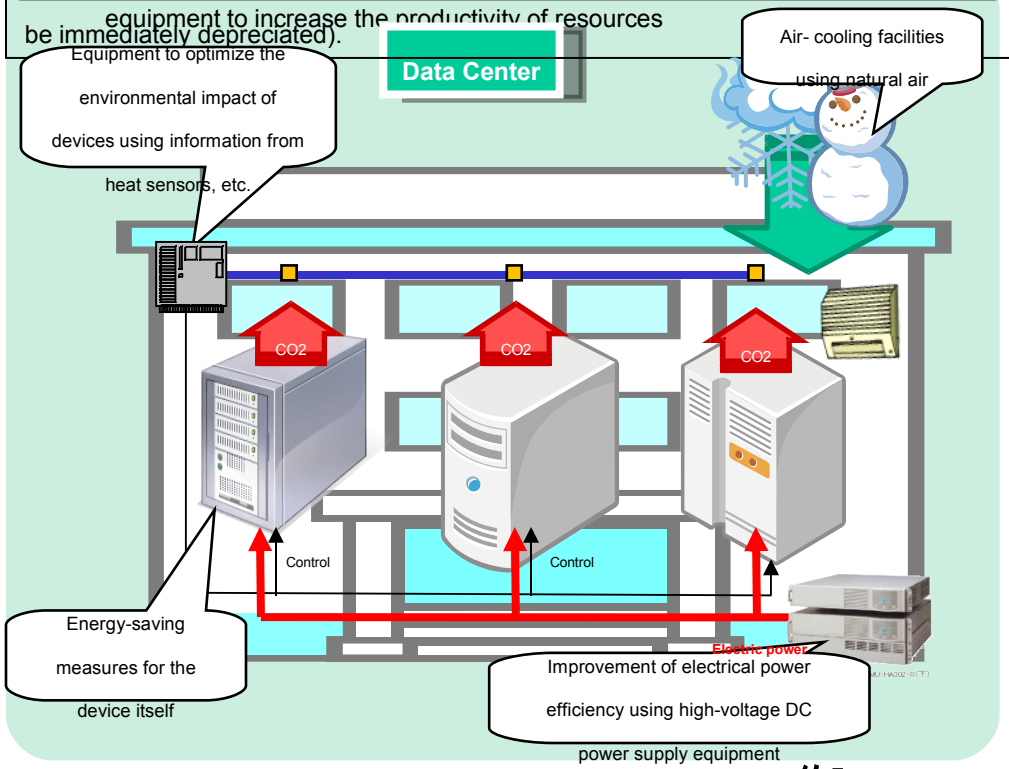
Companies that have established high targets to increase the productivity of resources (ex. (Value added)/(Energy consumed)), have filed an application for approval of the plan to the competent Minister, and have been approved. The scope of support covers relevant investment in activities regarded as having more than a certain level of effect from among those described in the approved plan.

<Examples of facilities within the scope of support in the ICT field>

(Tax measures)

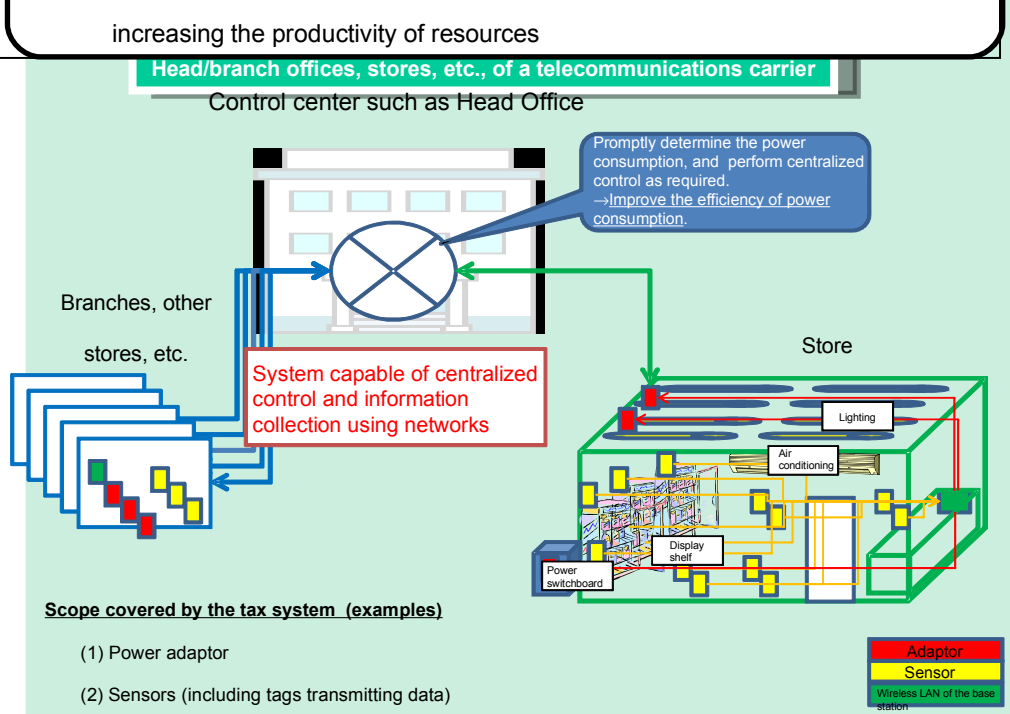
National tax (Corporate tax/income tax): Special depreciation equivalent to 30% (in cases of buildings, 15%) of the acquisition price (Those performed or introduced before March 31, 2011, can be immediately depreciated).

Ex. 1: Where a telecommunications carrier introduces various kinds of energy-saving equipment to increase the productivity of resources



Ex. 2: Where wireless/wired networks are used to promptly determine the power consumption of each branch (Those performed or introduced before March 31, 2011, can be immediately depreciated).

increasing the productivity of resources



Thank You