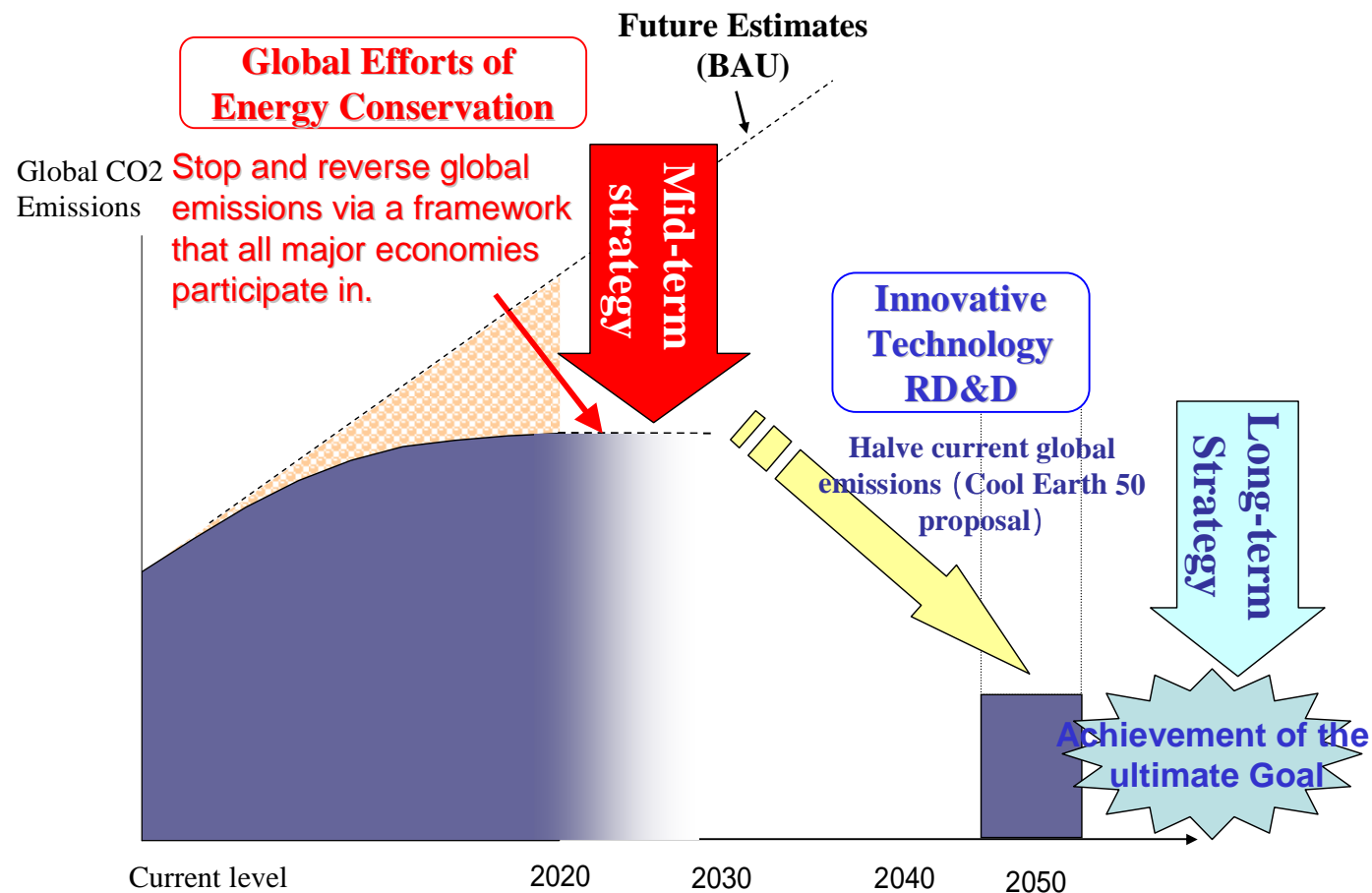


# Green IT Initiative in Japan

METI, Japan  
October, 2008

# 1. Halving Global Emissions by 2050

Active discussion has been held at various international meetings to establish a framework to succeed the Kyoto Protocol (post-Kyoto framework). Japan proposed to reduce CO<sub>2</sub> emissions at least by half by 2050.



## 2. Japan's Position towards the Global Warming

### Cool Earth Promotion

#### 1 . Sectoral Approach

- Japan, along with other major emitters, will establish quantified national targets for emissions reductions.
- The target could be set based on a bottom-up approach by compiling on sectoral basis energy efficiency and trying up the reduction volume.

#### 2 . Cool Earth Partnership

- Energy efficiency should be improved 30% all over the world by 2020.
- Japan establishes new US\$10 billion financial Mechanism to support developing countries.

#### 3 . Development of Innovative Technologies for the Earth

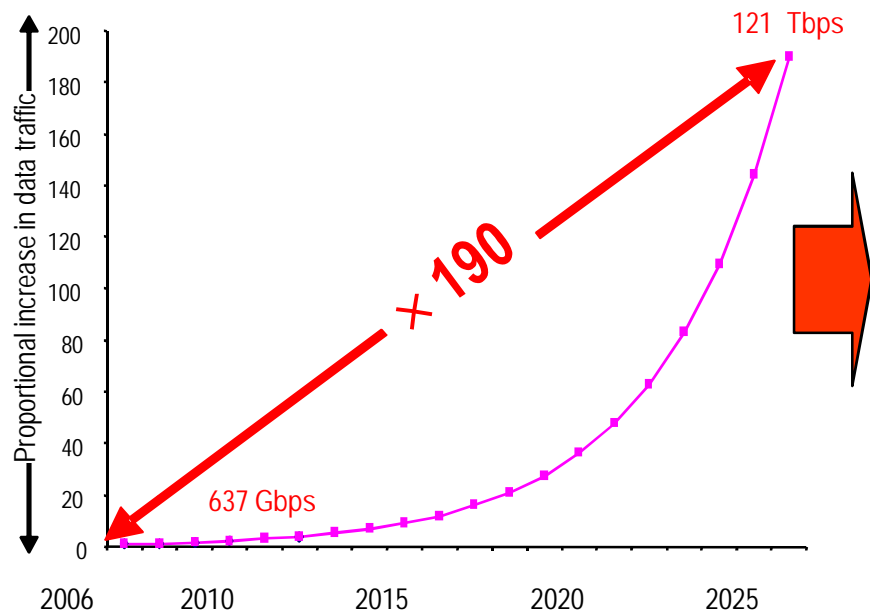
- Japan will also be investing about US\$ 30 billion in R&D in the environment and energy sectors over the next five years.

### 3. Background of Green IT

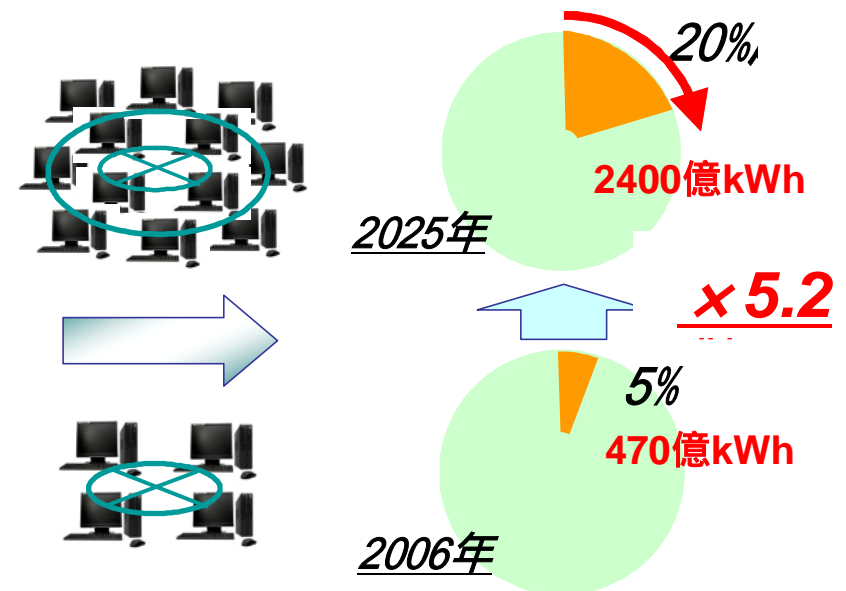
- With the internet period, It is estimated that by the year 2025, the amount of data traffic on the internet will be 100-200 times its present value.
- The electricity consumption of IT devices (servers, network equipment, PCs and displays) is estimated to grow 5-fold (20% of total generated electricity power) in 2025 than that of today.

Estimated Amount of Data Circulating within the Internet in Japan (2006-2025)

(times)

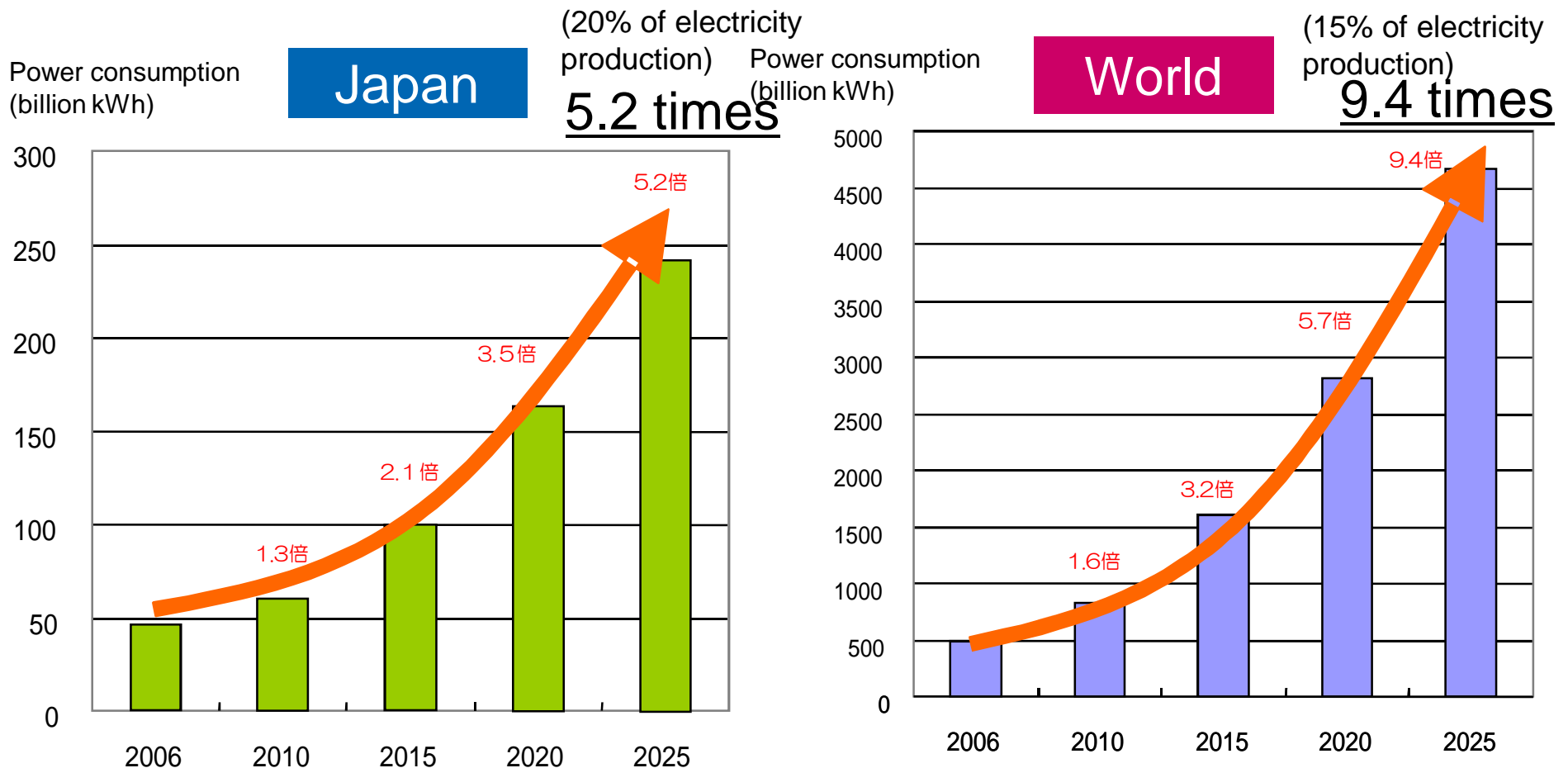


Estimated Amount of Power Consumption by IT equipments in Japan (2006-2025)



# 4. Estimation of IT Electricity Consumption

The advent of information societies in both developed and developing countries including BRICs, is leading to increasing IT device/systems power consumption rapidly, becoming a global issue.

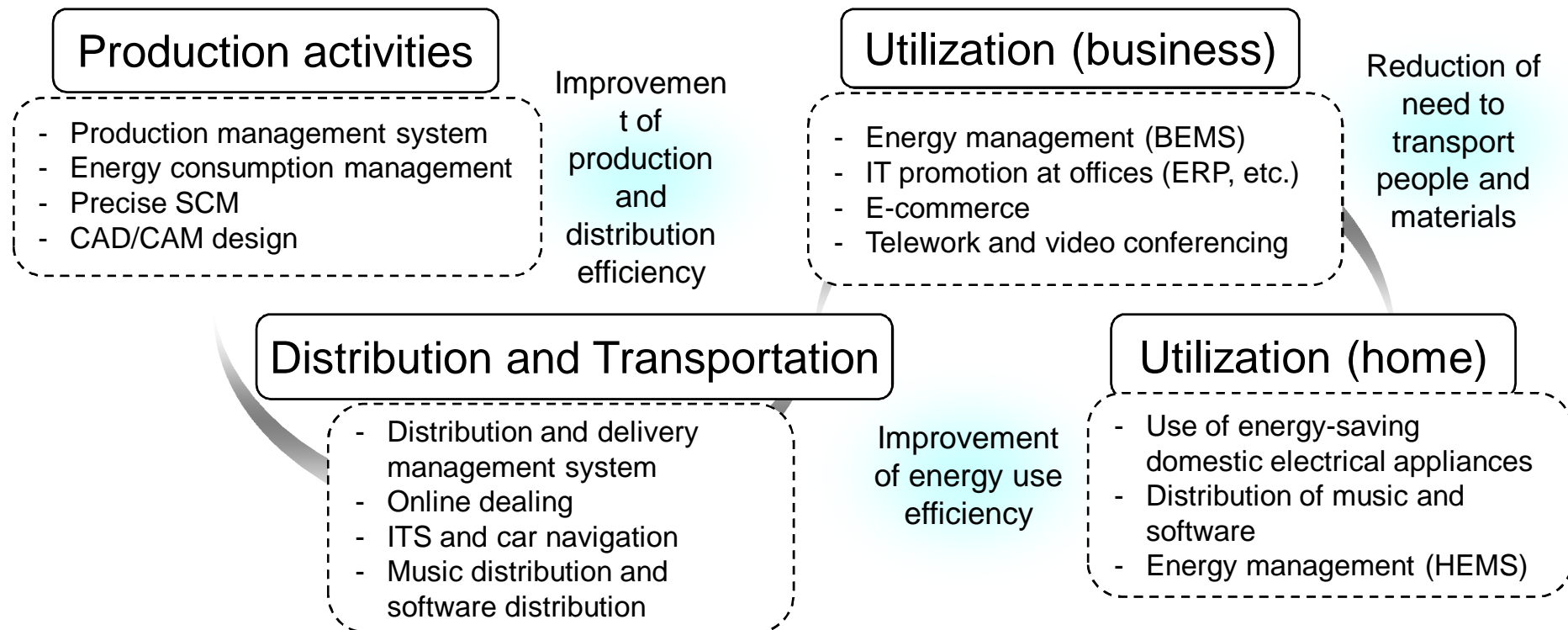


(Source) METI / Green IT Promotion Council (2008)

## 5. IT's Positive Impact on Environment

- IT has been actively used in quite a large number of fields including industry, transportation, business, and homes and greatly help reduce the environmental burden by improving the operational efficiency of those fields.

Effective use of IT greatly helps reduce society's environmental burden



# 6. Example of IT's Positive Impacts in Japan

(Examples)

## Production activities

- A 12% reduction in energy consumption required for the manufacture of automobiles, achieved by using a system that synchronizes operations of machines and peripheral facilities
- A reduction of about 20% in energy consumption, achieved by the real-time optimization of controls of the operation system of an oil refinery (Petrochemical manufacturer)

## Utilization (business)

- A reduction of more than 40% of the maximum of power consumption, achieved by the unified management and optimally coordinated operation of freezers and air conditioners at supermarkets and other stores (Electric manufacturer)
- A 35% reduction of energy consumption, achieved by controlling air conditioners of air terminal buildings in line with flights by gate (Airport)

## Distribution and transportation

- A reduction of about 5% in energy consumption\* made possible through unified management based on the SCM using technologies such as radio frequency identification (RFID), and allocation of vehicles through the most efficient routes

## Utilization (home)

- Promoting energy saving in homes using the world's highest-level energy-saving technologies



LCD and plasma TVs

Reduction by more than 30% in three years



Air conditioners

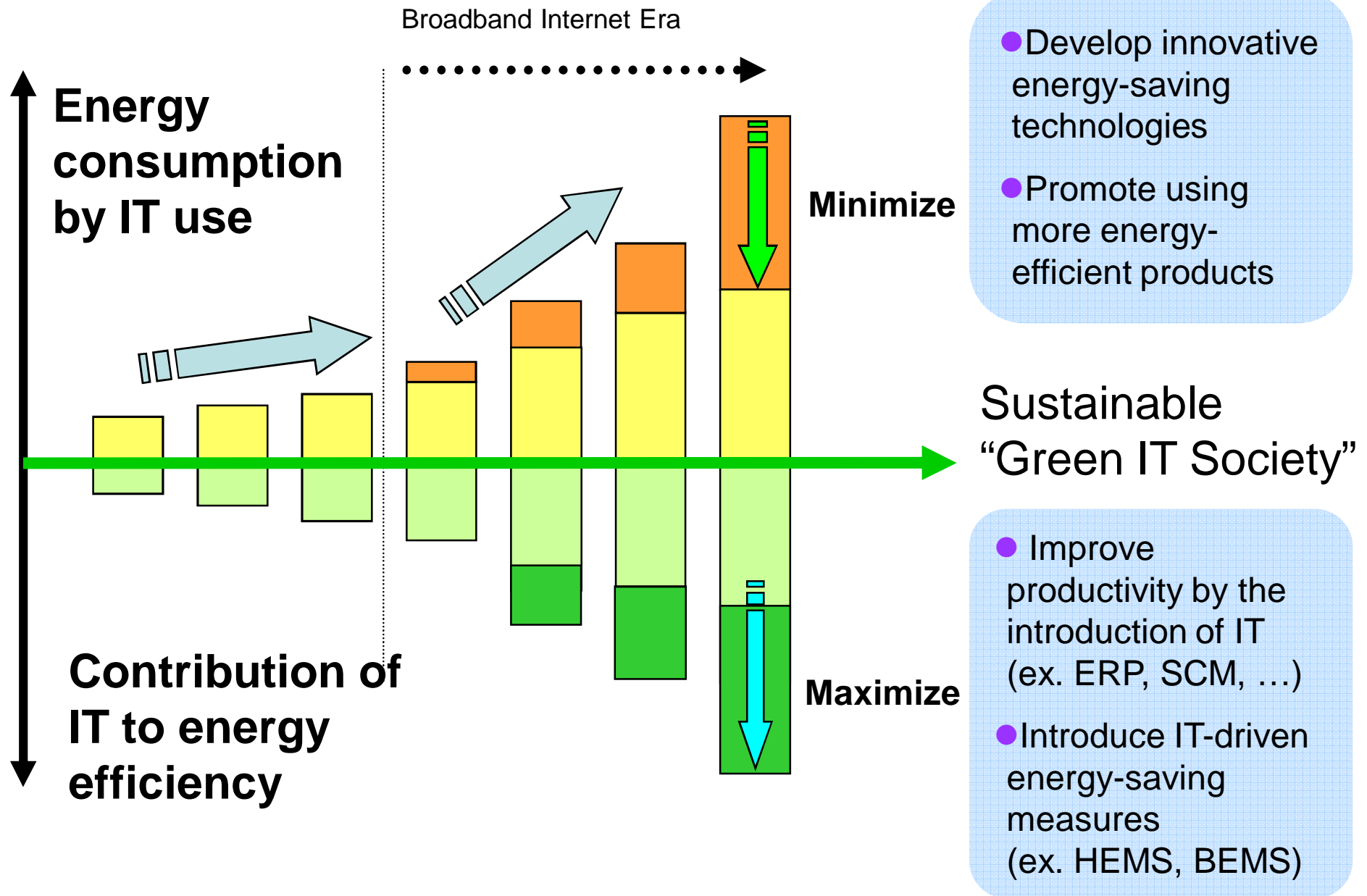
Reduction by 40% in ten years



Refrigerators

Reduction by 50% in ten years

# 7. IT Society in Harmony with the Environment



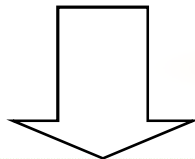


## 8. Basic concept of Japan's "Green IT"

Traditional concept of "Green IT" focuses mainly on how to reduce energy consumption of IT equipment and systems including data centers. Japan's "Green IT" concept focuses on both "Saving energy of IT" and "Energy-efficient society by IT".

### *Saving energy of IT*

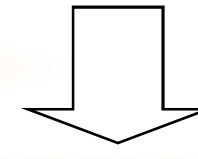
- Electric appliances are getting more energy-efficient year by year.  
(e.g.) Energy consumption of fridges has decreased by 40-50% over the past decade.
- The advent of an information society has led to skyrocketing energy consumption by IT devices.



- Halving energy consumption of data centers
- Reduction in energy consumption for communication to 1/100 by using photonic technologies

### *Energy-efficient society by IT*

- Energy consumption in factories was successfully cut 20% by introducing energy optimum management systems.
- Introduction of electronic measurement technologies led to a 60% improvement in CO2 emissions rate over the last 15 years.



More efforts for our society to be energy efficient

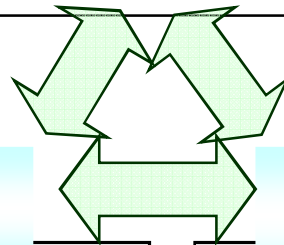
- Optimum control of industrial complex by IT
- Visualization of environmental contribution by using IT including measurement devices

## 9. Green IT Initiative In Japan

METI hosted the “Green IT Initiatives Meeting” last December to propose that the national movement to promote “Green IT”.

### Enhancement of the collaboration of industry, academia, and government

- Examination of how to create opportunities for enhancing the collaboration of industry, academia, and government  
(Green IT Promotion Council (Established on Feb.1, 2008))



### Government initiatives

- Breakthroughs by innovative technologies
  - Promotion of the “Green IT Project”
- Education and promotion of Green IT
- Framework of evaluating environmental contributions of IT to society

### International Cooperation

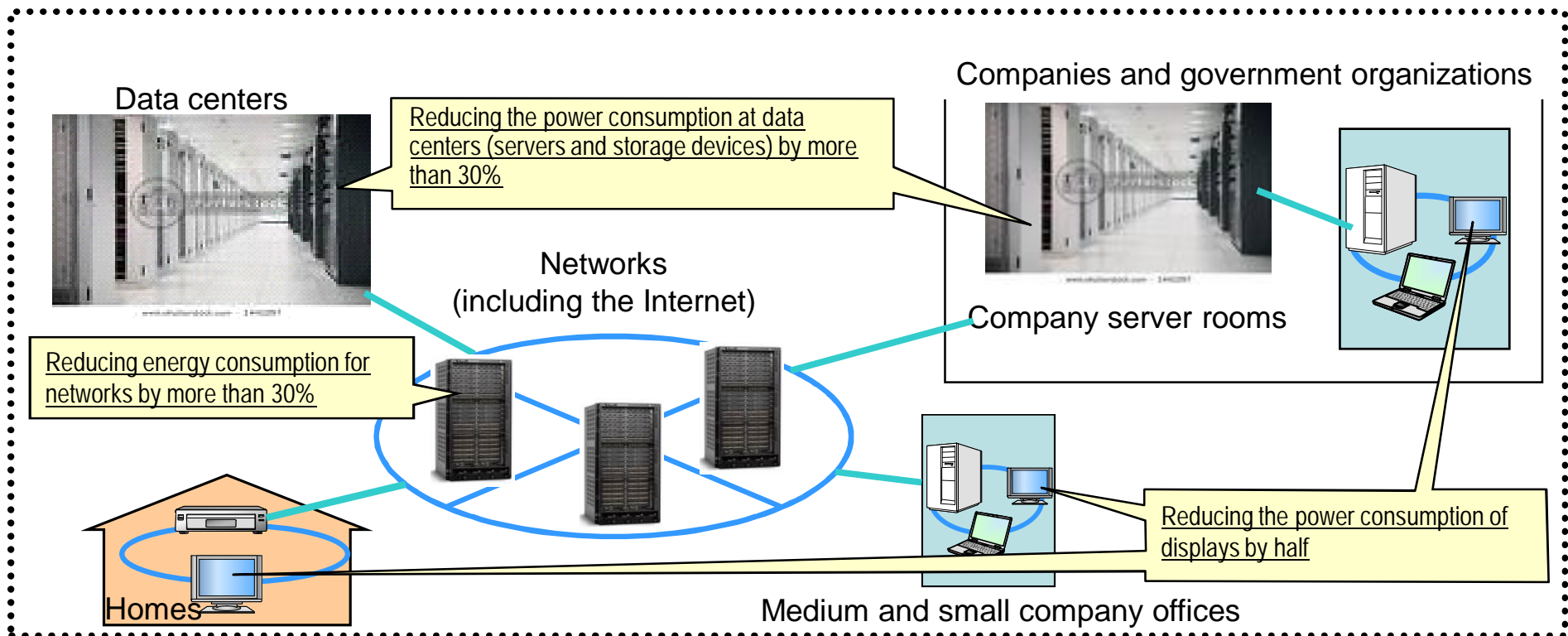
- Green IT International Symposium
- Collaboration with overseas organizations (ex. The Green Grid, Climate Savers...)

# 10. Major R&D Projects for Innovative Technology

The “Green IT Project” will be started to develop innovative IT technologies based on medium and long-term perspectives (budget for fiscal 2008: 3 billion yen/year) to establish “Green IT Society”.

## Green IT Project

Development of innovative technologies to achieve a drastic reduction of energy consumption for entire network systems including data centers, in addition to saving energy for IT devices

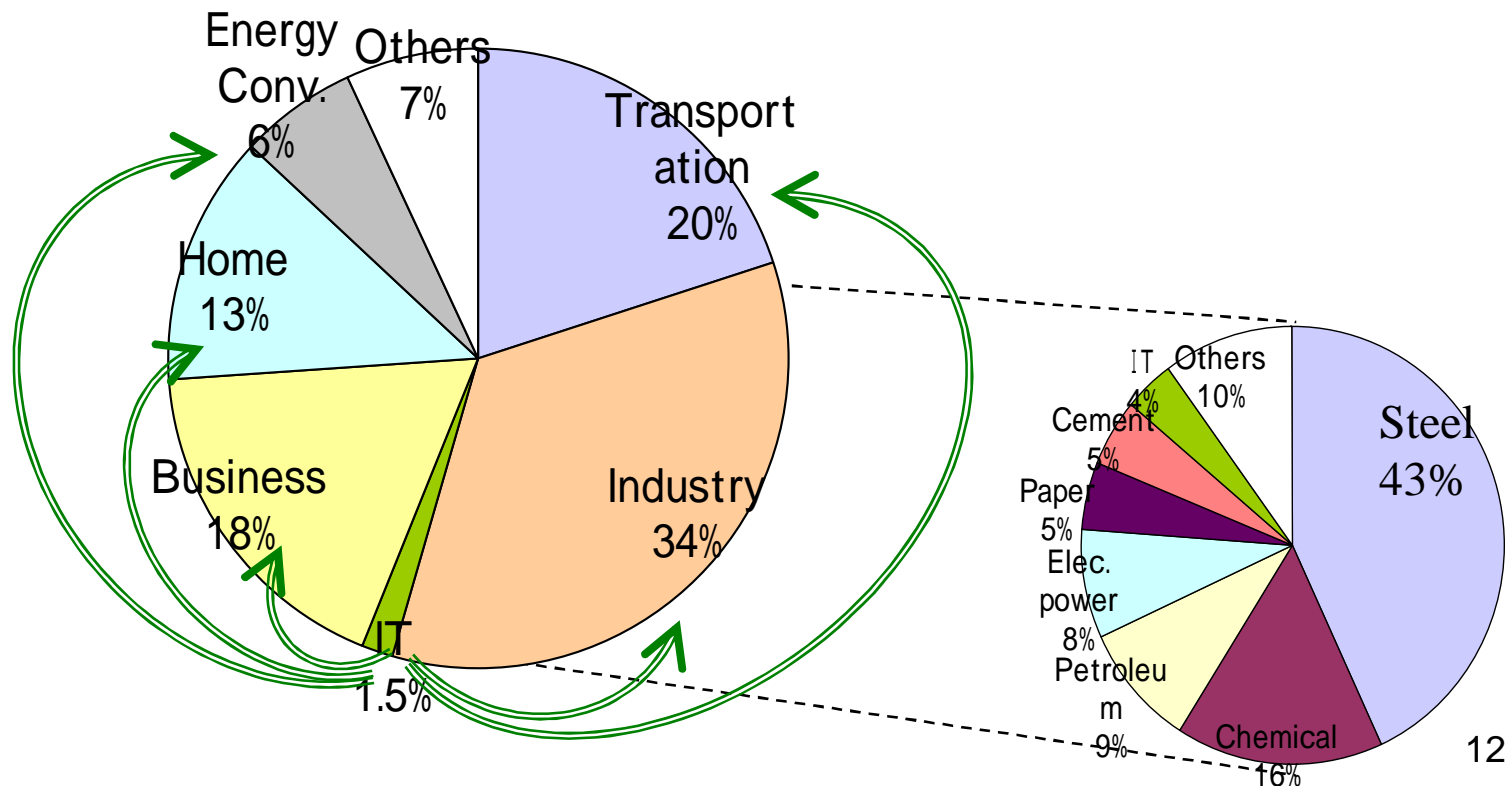


# 11. 2% vs. 98% issue: IT is more contributor than polluter

While CO2 emission by IT industry is less than 2% of that of whole Japan, IT contributes to reduction of CO2 emissions in other 98% areas. Then, how to measure the contribution, while combining the effect in supply side with demand side?

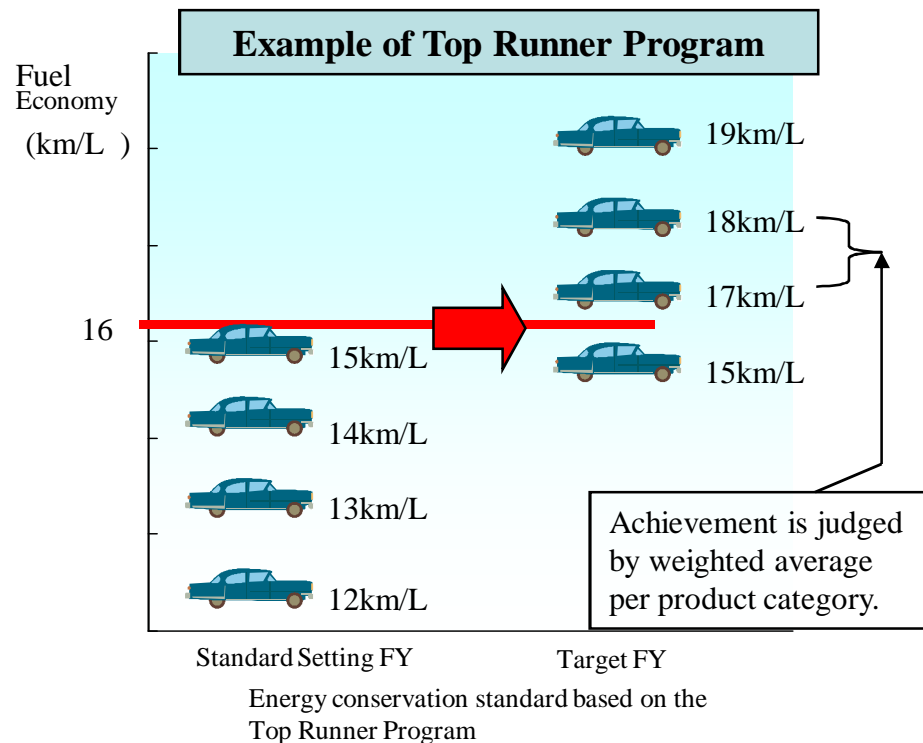
Total CO2 emissions of Japan in each sector

1.3 billion t



# 12. Top Runner Program

■ The Energy Conservation Law stipulates energy conservation standards for electric appliances and motorcars according to the Top Runner Method. Manufacturers and the like have to comply with the standards, and if they don't, they are imposed recommendation, publication, order or penalty.



## Specific Equipment (21)

- |                            |                            |
|----------------------------|----------------------------|
| 1. Passenger vehicles      | 12. Space heaters          |
| 2. Freight vehicles        | 13. Gas cooking appliances |
| 3. Air conditioners        | 14. Gas water heaters      |
| 4. TV sets                 | 15. Oil water heaters      |
| 5. Videocassette recorders | 16. Electric toilet seats  |
| 6. Fluorescent lights      | 17. Vending machines       |
| 7. Copying machines        | 18. Transformers           |
| 8. Computers               | 19. Rice cookers           |
| 9. Magnetic disk units     | 20. Microwaves             |
| 10. Electric refrigerators | 21. DVD recorders          |
| 11. Electric freezers      |                            |

\*) Routers/Switches will be added to the list soon.

**\*Top Runner Program:** The concept of the program is that fuel economy standards for vehicles and energy conservation standards for electric appliances, etc. shall be set exactly the same as or higher than the best standard value of each product item currently available on the market.

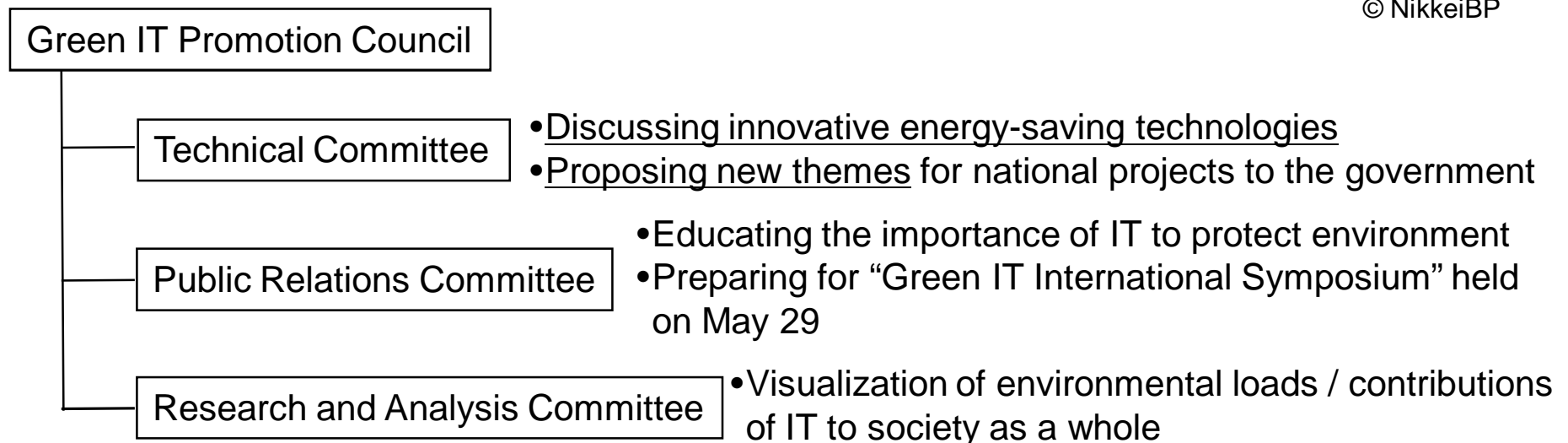
# 13. Establishment of Green IT Promotion Council

■ As a organization to promote “Green IT” movement, “Green IT Promotion Council” was established on February 1, 2008.

- Over 100 companies and organizations participate in the council and JEITA (Japan Electronics and Information Technology Industry Association) is in charge of secretariat.
- METI and other governmental organizations also participate in the council as observers.



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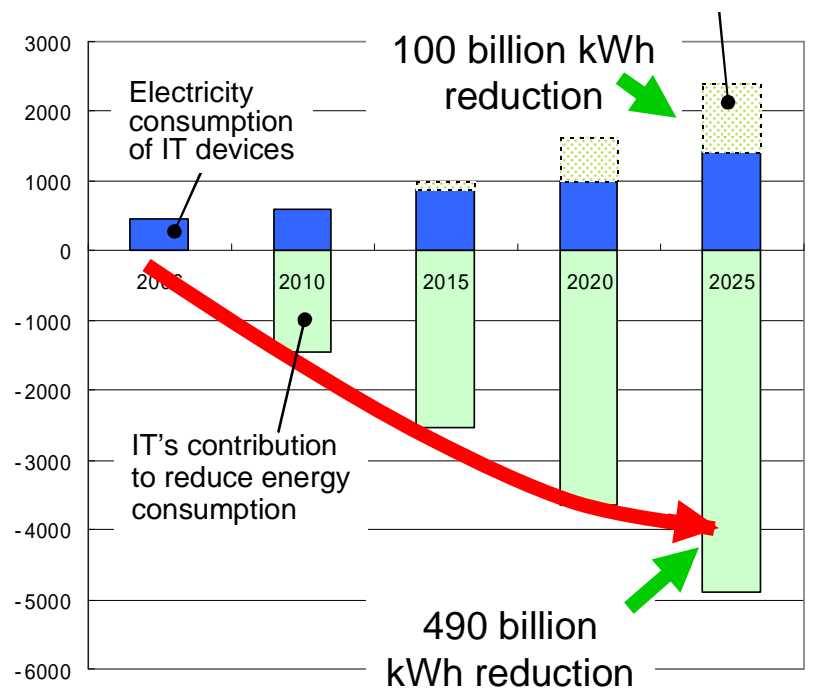


# 14. Contribution of Green IT in the World

The amount of “energy-savings by IT use” will exceed that of “energy consumption of IT devices” and IT can contribute the reduction of energy consumption of whole society if “Green IT” is actively promoted.

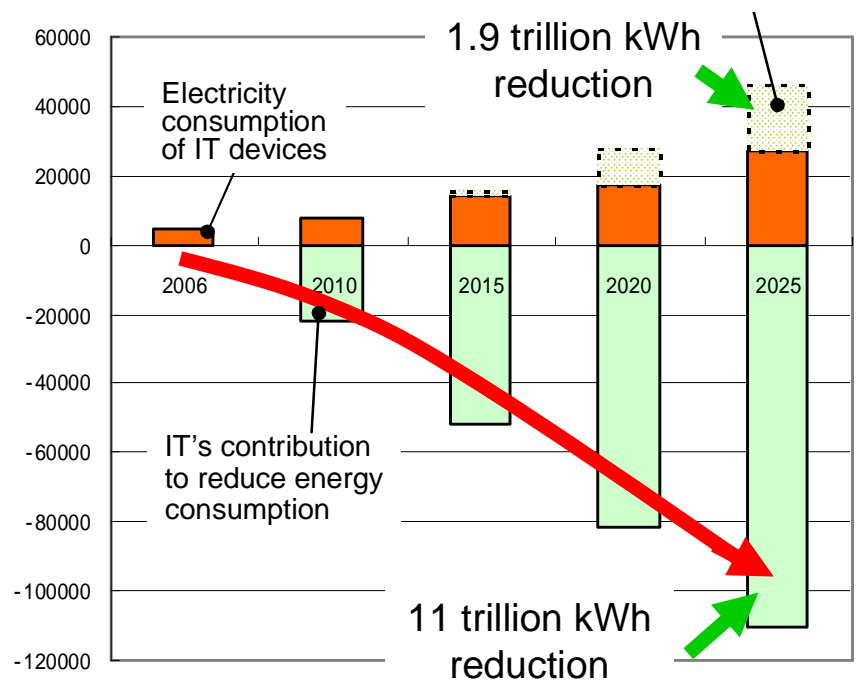
Electricity equivalent (billion kWh)

## Japan



Electricity equivalent (billion kWh)

## Worldwide



# 15. Mechanism to encourage Green IT activities

Production Item: Air conditioner

Last Year	Current Year
<p><b>Company A</b></p> <p><b>Production: 1 million units</b></p> <p><b>CO2 Emissions</b></p> <p>Production process: <b>100kt-CO2</b></p> <p>Operation process in homes: <b>300kt-CO2</b></p>	<p><b>Production: 500 thousand units</b></p> <p>Decrease in production by 500 thousand units affected by the boom of energy-saving air conditioner.</p> <p><b>CO2 Emissions</b></p> <p>Production process: <b>50kt-CO2</b></p> <p>Operation process: <b>150kt-CO2</b></p>
<p><b>Company B</b></p> <p><b>Production: 1 million units</b></p> <p><b>CO2 Emissions</b></p> <p>Production process: <b>100kt-CO2</b></p> <p>Operation process: <b>300kt-CO2</b></p>	<p><b>Production: 1.5 million units</b></p> <p>Increase in production by 500 thousand units with launching of energy-saving air conditioner which halves CO2 emissions</p> <p><b>CO2 Emissions</b></p> <p>Production process: <b>150kt-CO2</b></p> <p>Operation process: <b>225kt-CO2</b></p>
<p><b>Total</b></p> <p><b>Production: 2 million units</b></p> <p>Production process: <b>200kt-CO2</b></p> <p>Operation process: <b>600kt-CO2</b></p>	<p><b>Total</b></p> <p><b>Production: 2 million units</b></p> <p>Production process: <b>200kt-CO2</b></p> <p>Operation process: <b>375kt-CO2</b></p>

**Point 1**

**Point 2**

**Point 1**

Should Company B need to buy emission credit from Company A?

**Point 2**

Is this reduction in CO2 emission allowed to be used by Company B as a credit?



## Case 2

### Mechanism to prevent a negative impact on leakage to foreign countries

Production Item: Air conditioner

Last Year	Current Year
<p><b>Company A</b></p> <p>Production: 1 million units</p> <p><b>CO2 Emissions</b></p> <p>Production process: <u>100kt-CO2</u></p> <p>Operation process in homes: <u>300kt-CO2</u></p>	<p>Production: 500 thousand units</p> <p>Decrease in production by 500 thousand units affected by the boom of energy-saving air conditioner.</p> <p><b>CO2 Emissions</b></p> <p>Production process: <u>50kt-CO2</u></p> <p>Use in homes: <u>150kt-CO2</u></p>
<p><b>Company B</b></p> <p>Production: 1 million units</p> <p><b>CO2 Emissions</b></p> <p>Production process: <u>100kt-CO2</u></p> <p>Operation process: <u>300kt-CO2</u></p>	<p>Production: 1.5 million units</p> <p>Increase in production by 500 thousand units through the introduction of energy-saving air conditioner, but the additional production is done in low-efficiency overseas factory.</p> <p><b>CO2 Emissions</b></p> <p>Production(domestic): <u>100kt-CO2</u></p> <p>(overseas): <u>80kt-CO2</u></p> <p>Operation process: <u>225kt-CO2</u></p>
<p><b>Total</b></p> <p>Production: 2 million units</p> <p>Production process: <u>200kt-CO2</u></p> <p>Operation process: <u>600kt-CO2</u></p>	<p><b>Total</b></p> <p>Production: 2 million units</p> <p>Production process: <u>230kt-CO2</u></p> <p>Operation process: <u>375kt-CO2</u></p>

**Point 3**

**Point 3**

**Point 3**

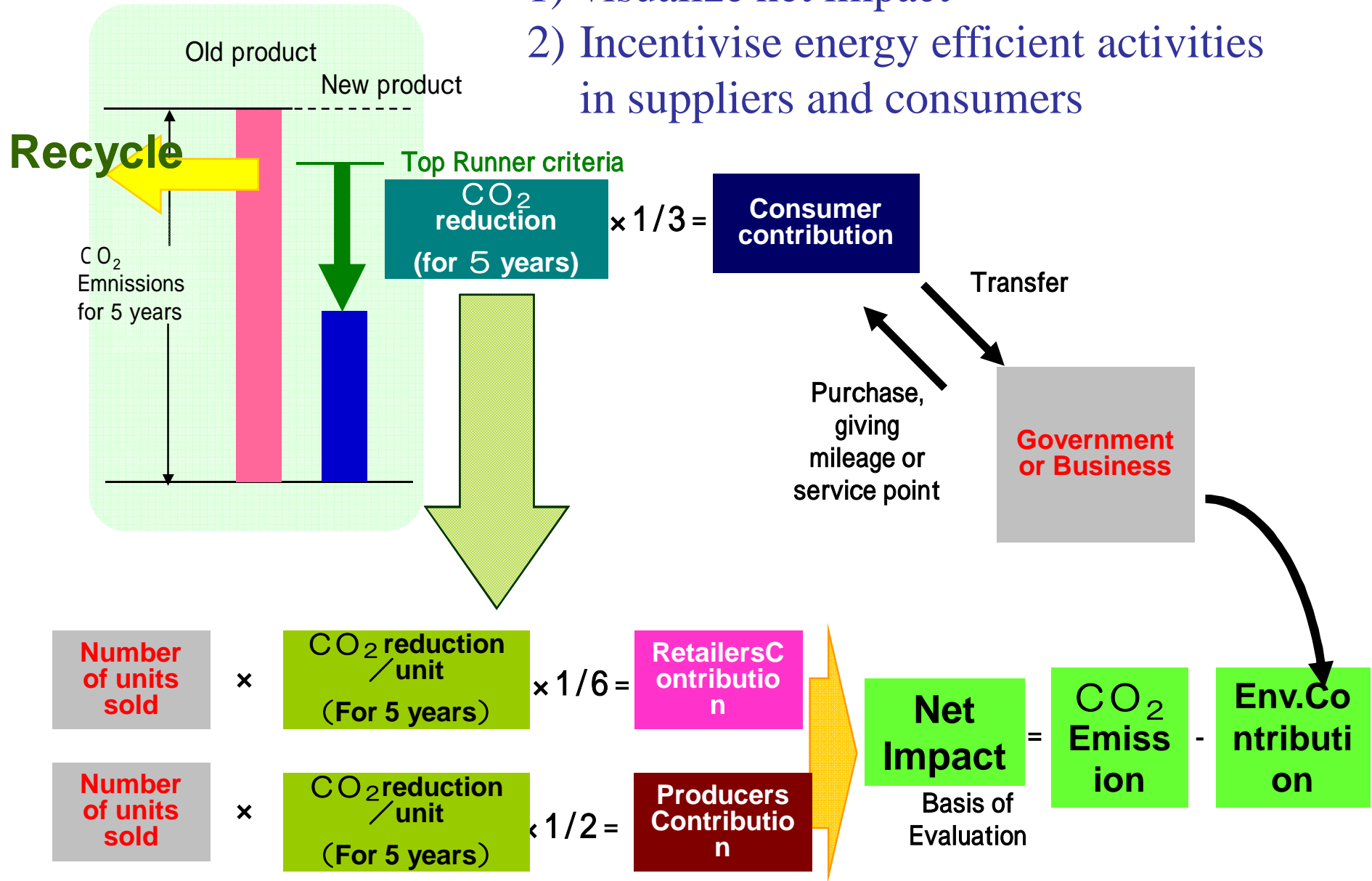
Is the effect of highly efficient domestic production available as emission credit?  
 Is the influence of Company B's emission of Company B by shifting production overseas regarded as discredit?  
 Is it reasonable to levy taxation on import caused by transfer of production basis to a low-efficiency overseas factory?

# 16. From Trade-offs to Compatibility

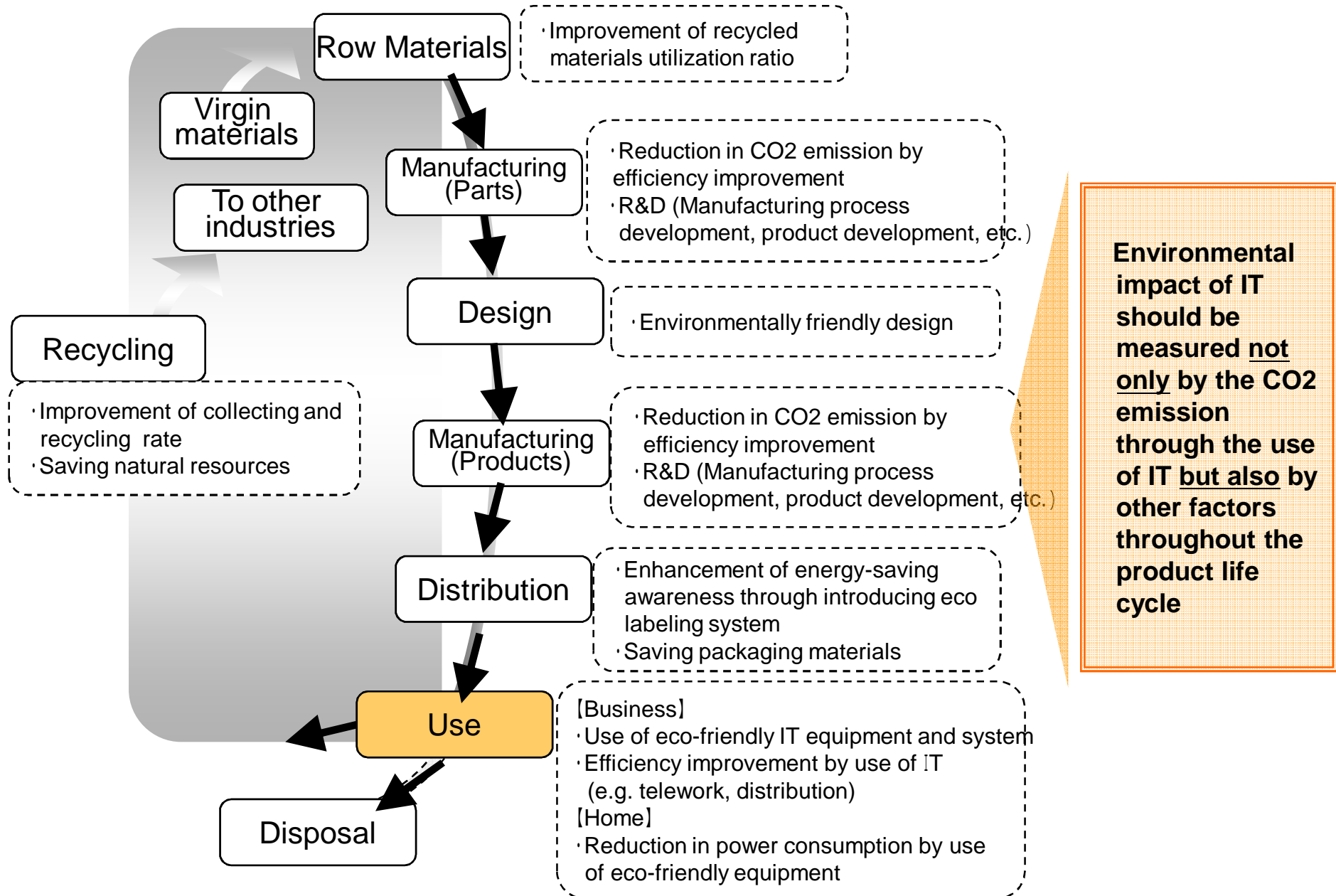
	Current Status		→	Merit of New System
	Ecology	VS Economy		Ecology + Economy
Consumer (Demand side)	Desire for energy-conserving products	Expensive		Decrease in substantial price
Producers (Supply side)	Introduction of technology to reduce carbon Footprint (Products, Processes)	Costly (Uneasy to sell or negative profit)		Decrease in substantial cost or rooms for raising price
	More sales in environment-friendly products or services while overcoming	More production →more CO2 emission →negative reputation or more cost		Decrease in net environmental burden →improve reputation and economic benefit

# 17. New Mechanism to be considered

- 1) visualize net impact
- 2) Incentivise energy efficient activities in suppliers and consumers



# 18. Widening the scope in the future



A close-up photograph of several green leaves with prominent veins. The leaves are covered with numerous small, clear water droplets, suggesting a recent rain or dew. The lighting is soft, highlighting the texture of the leaf surfaces.

# Green IT Initiative