TOSHIBA
Leading Innovation

Toshiba Group's Environmental Vision 2050

Meeting Environmental challenges – The first stage

Environmental Vision 2010

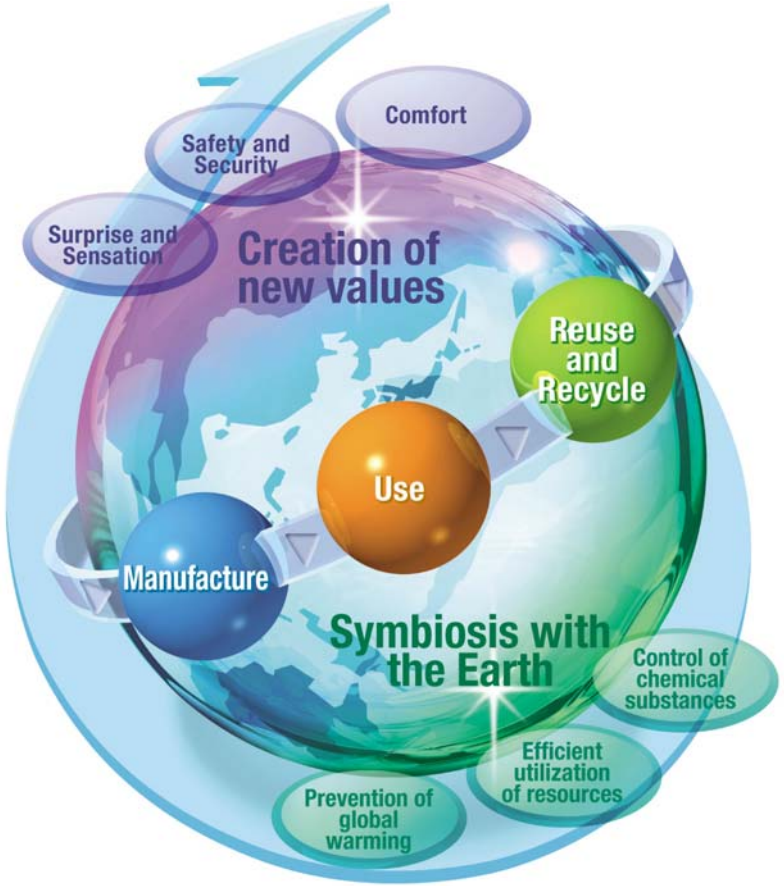
Toshiba Group Slogan

Committed to People,
Committed to the Future. TOSHIBA

Contribute to sustainable development of the Earth throughout our business processes and products

Double overall eco-efficiency
FY2000 ➡ FY2010

Product eco-efficiency	Business process eco-efficiency
Factor T - Products 2.2	Factor T- Process 1.2
Value of a product/ Environmental impact of a product throughout its lifecycle	Sales/Environmental impact of the entire business process



Meeting environmental challenges – The first stage

Double Overall Eco-Efficiency

FY2000 ➡ FY2010

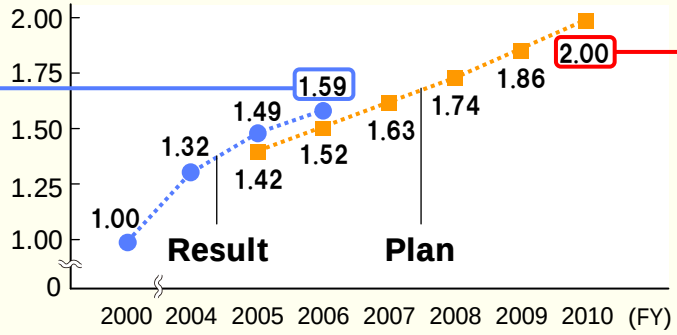
FY2006

Result: 1.59 times

(1.68 time (product)
1.22 times (business process))

Compared with FY2000

Overall eco-efficiency



FY2010

Target: 2 times

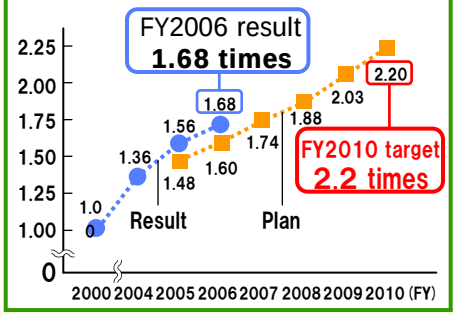
(2.2 times (product)
1.2 times (business process))

Compared with FY2000

Product Eco-efficiency

Value of products (performance improvement) / Environmental impacts of products

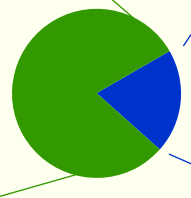
2.2 times



Composition of environmental impacts during product life cycles (Average of all products of Toshiba Group)

Environmental impacts of products (from procurement of raw materials to final disposal)

80 %



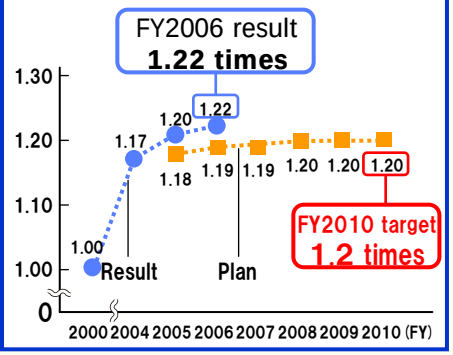
Environmental impacts of business processes (manufacturing)

20 %

Business Process Eco-efficiency

Sales / Environmental impacts throughout business processes

1.2 times



Moving towards 2050 - The Second Stage

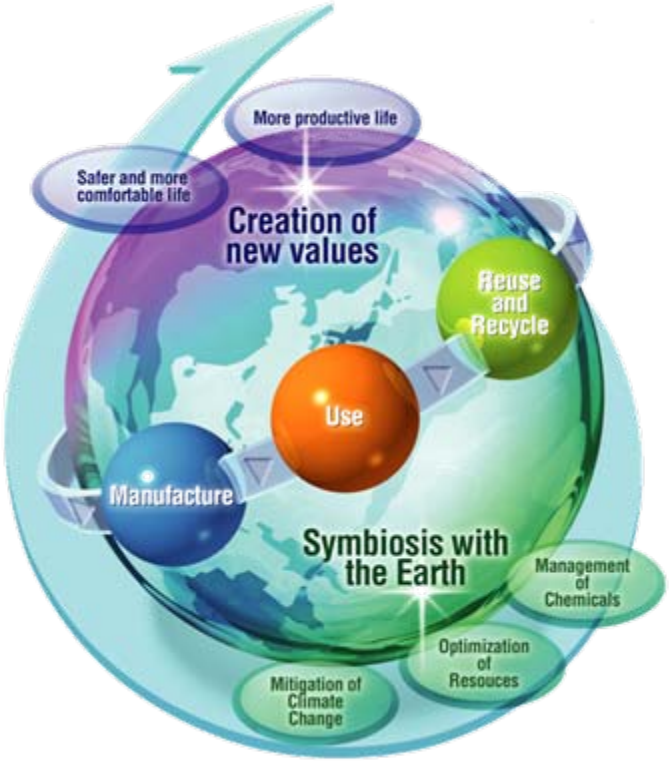
The ideal situation in 2050

People lead rich lifestyles in harmony with the Earth

Challenges to meet

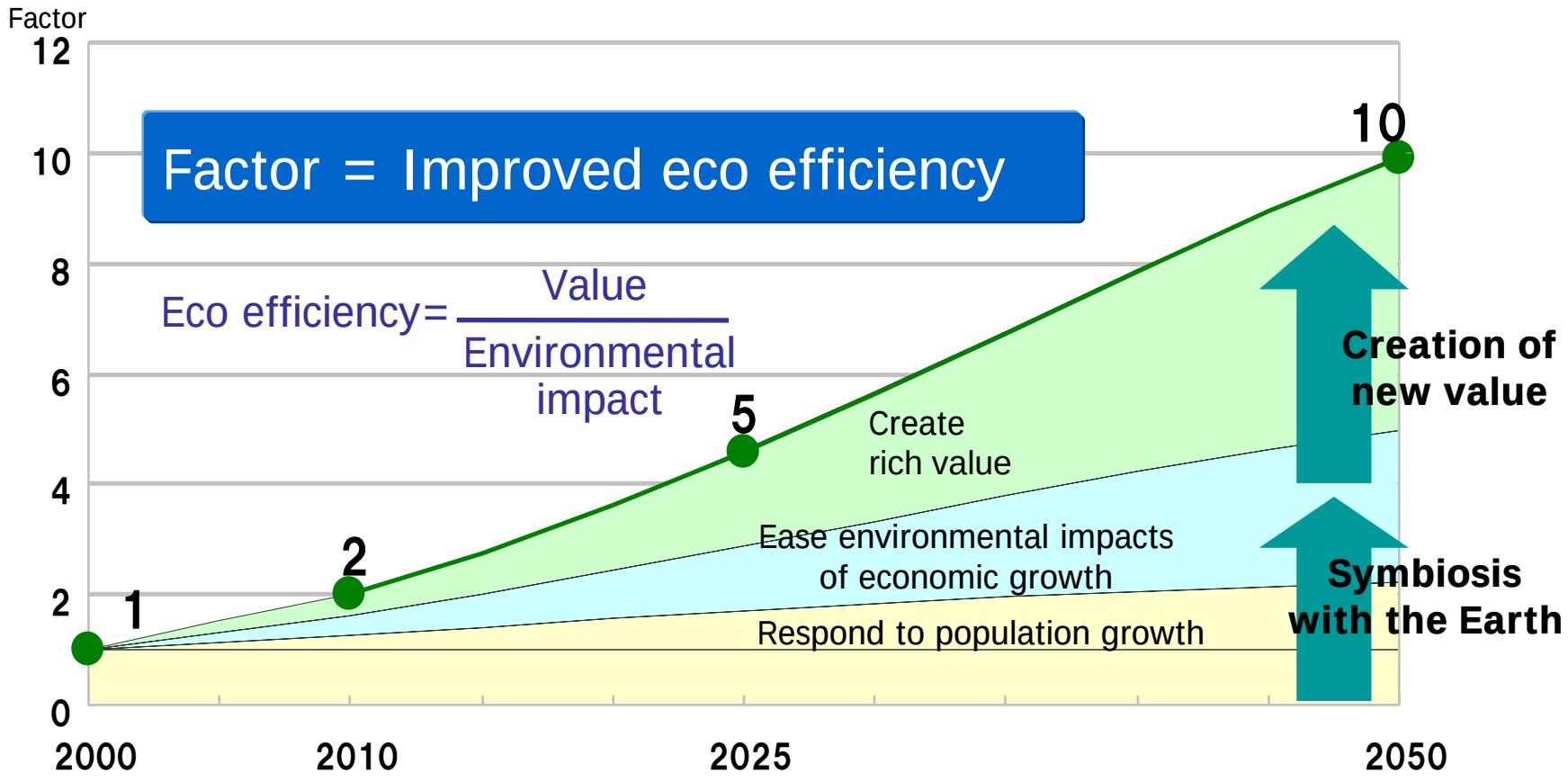
- Reduce the environmental impacts of population growth
- Ease the environmental impacts of economic growth
- Create rich value

Environmental Vision 2050



Environmental Vision 2050

Towards “People lead rich lifestyles in harmony with the Earth”



Environmental Vision 2050 ➡ Factor 10

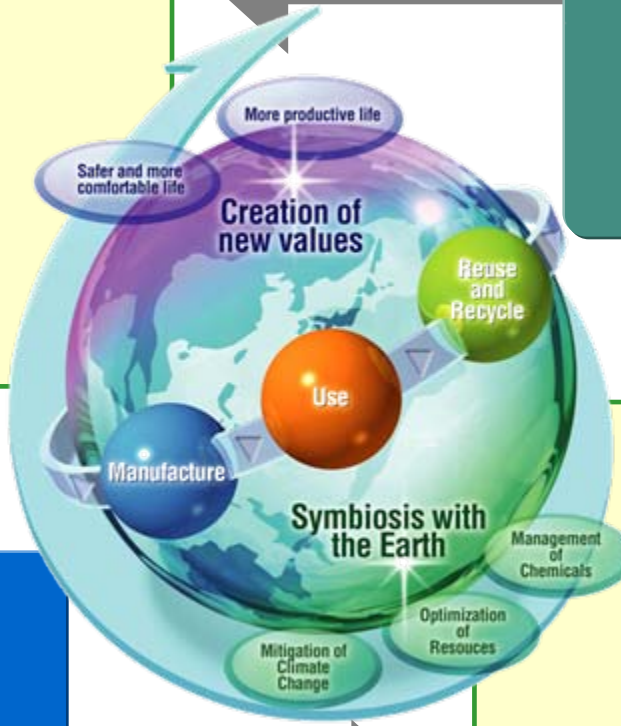
Two Approaches

Eco Products Approach

The approach from “Creation of new value”

Grow while offering new value

Value Innovation



Gain profit through radical change

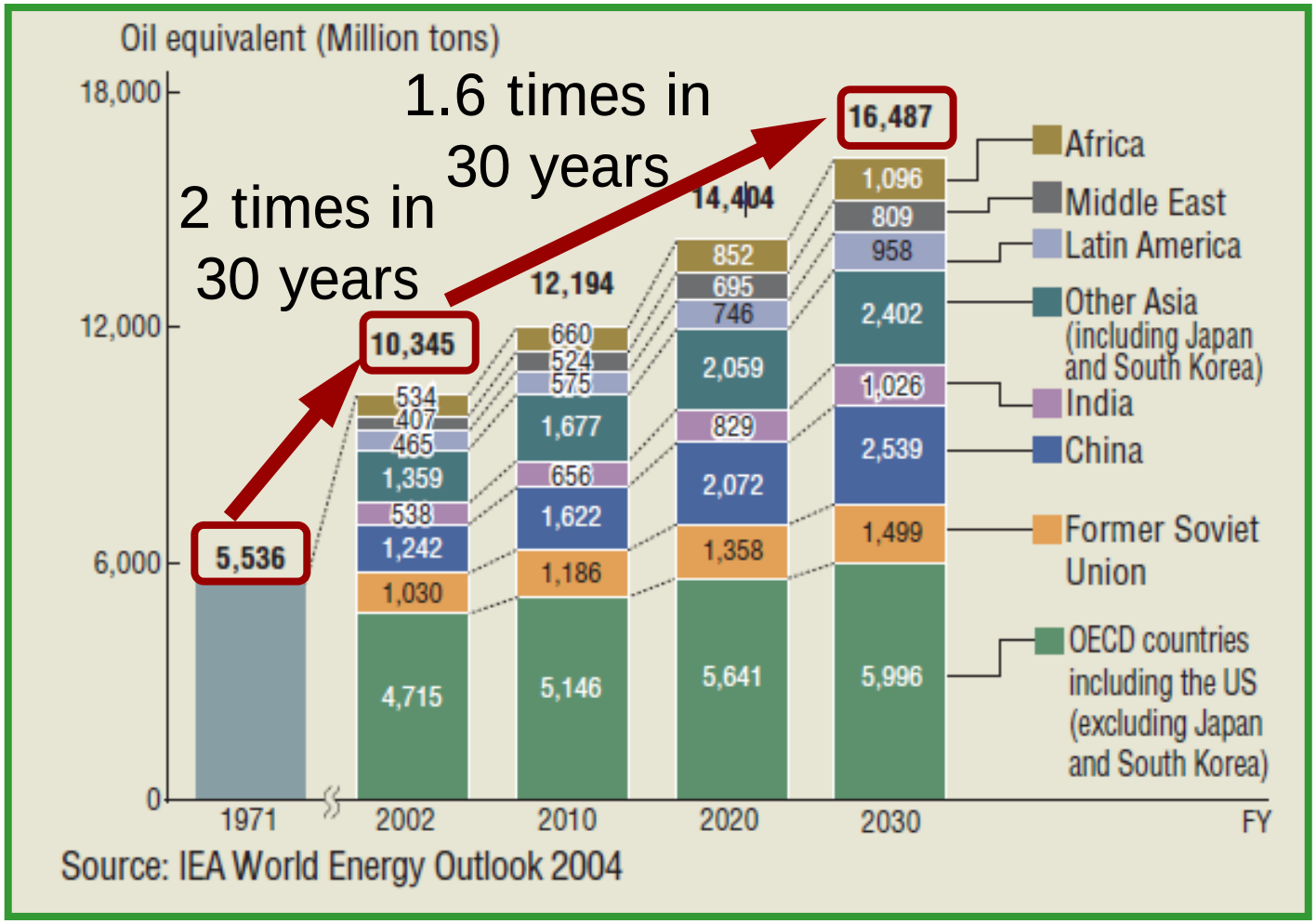
Process Innovation

The approach from “Symbiosis with the Earth”

Energy Approach

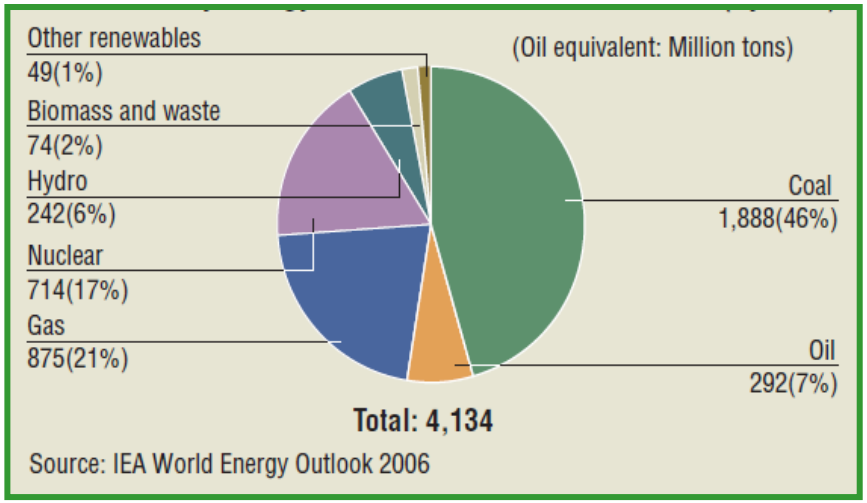
Trend in energy consumption

World Primary Energy Demand Projections

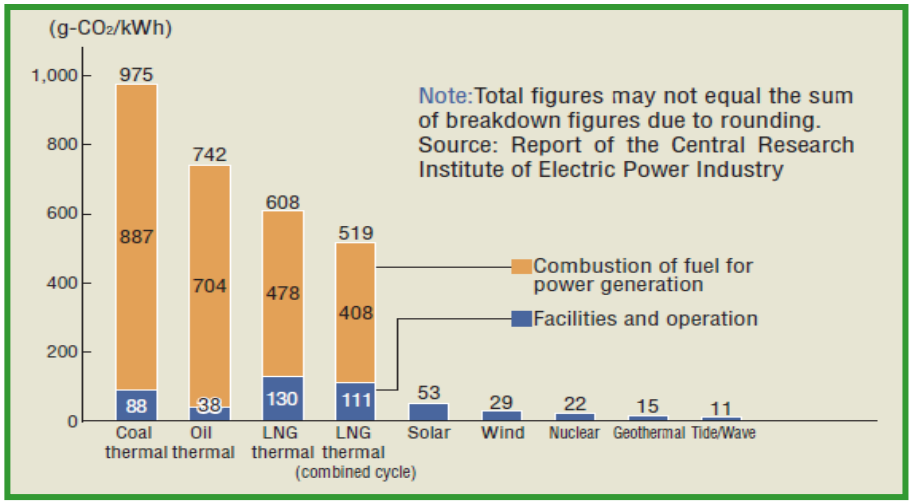


The Best Energy Mix

World Primary Energy Demand for Power Generation by fuel



CO_2 Emissions by Type of Plant



Two goals to meet

- Reliable energy supply
- Mitigation of climate change

The best energy mix

- High efficiency thermal plants
- Renewable energy
- Advanced nuclear plants

Energy Approach

Two areas that must be addressed

Reliable energy supply
- achieve energy security -

Mitigation of climate change
- reduce CO_2 emissions -

Energy mix solution

Nuclear , thermal and hydro power generation

New energy

Contribute to better environment, reliable energy supplies as “A Corporate Citizen of Planet Earth”

We aim to support safe, secure, richer lifestyles for people worldwide

CO_2 Reduction in Energy Production

Toshiba will promote the following measures in energy production.

Measures of Toshiba energy vision

Promote nuclear power and establish FBR & the nuclear fuel cycle.

Zero CO_2 emissions by performance improvements in thermal power systems, e.g. CCS*

*Carbon Capture & Storage

Zero power loss by superconductivity transmission & stable dispersed energy supply by microgrid

Promote commercialization of dispersed power and renewable energy systems

Energy Innovation

	Process innovation	Value innovation
Nuclear power	Reduce CO_2 emissions by promoting high reliability LWR Light Water Reactor (LWR) Volume of CO_2 reduction per unit: 6.7m tons/year	Converve uranium resources by reprocessing nuclear fuel FBR
Thermal & hydro power	Reduce CO_2 emissions by improving performance of thermal power plants Advanced Combined Cycle Volume of CO_2 reduction per unit: 0.13m tons/year Ultra Supercritical (USC) Volume of CO_2 reduction per unit: 0.32m tons/year	Achieve zero CO_2 emissions by combining Carbon Capture & Storage and advanced ultra supercritical turbines Advanced Ultra Super Critical (A-USC) Volume of CO_2 reduction per unit: 5m tons/year
Transmission & distribution	Reduce CO_2 emissions by reducing loss in electric transmission at ultra high voltage Ultra High Voltage (UHV) Volume of CO_2 reduction per unit: 7 tons/year	Microgrid, new concept power supply; Reduce environmental loads by superconductive transmission Micro-grid
New energy	Reduce CO_2 emissions with renewable geothermal and wind power generation Geothermal power Volume of CO_2 reduction per 50MW unit: 0.33m tons/year Wind power Volume of CO_2 reduction per 2MW unit: 5k tons/year	Reduce CO_2 emission by residential fuel cell co-generation Residential fuel cells Volume of CO_2 reduction per unit: 1.2 tons/year

Energy Process innovation

Construct highly reliable LWR

Reduce CO_2 emissions by constructing highly reliable LWR offering high-level cost performance

ABWR

AP1000

Improved efficiency, enhanced reliability and more cost-efficient operation

Volume of CO_2 reduction per unit: 6.7m tons/year

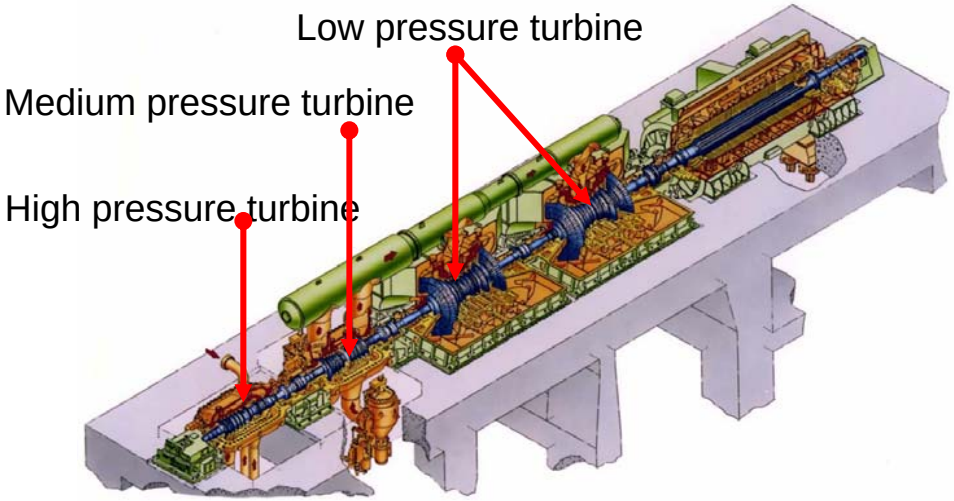
*LWR= light water reactor

Energy Process innovation

Improve performance of thermal power plant

Reduce CO_2 exhaust emissions by improving performance of thermal power plants

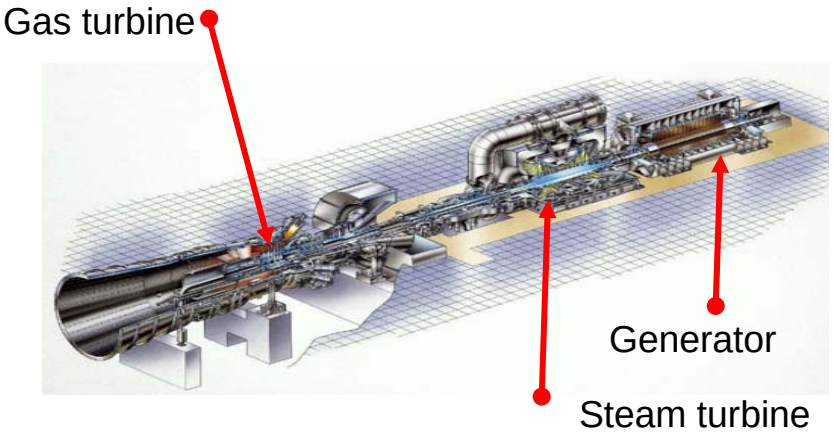
USC



Raise efficiency with higher steam temperatures

Volume of CO_2 reduction per unit: 0.32m tons/year

High temperature gas turbine



Raise efficiency with higher working fluid temperatures

Volume of CO_2 reduction per unit: 0.13m tons/year

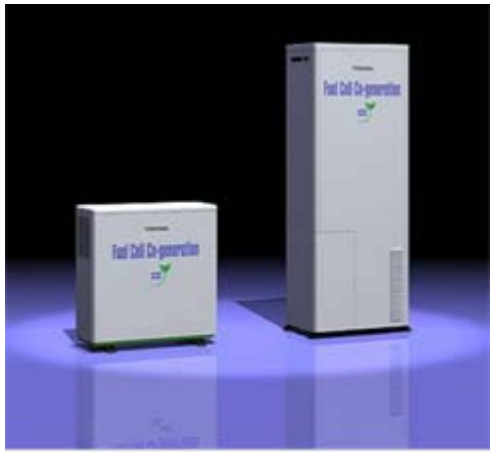
Energy Value innovation

Development of residential fuel cells

CO_2 reduction by residential fuel cell co-generation

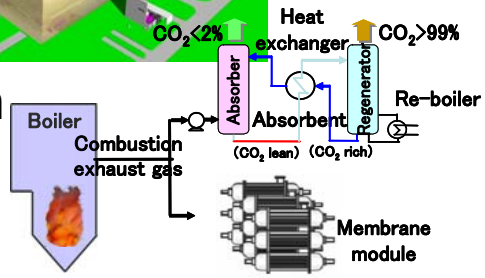
A new concept power generation system that utilizes waste heat of power generator for residential hot water supply

Volume of CO_2 reduction per one million units: 1.2m tons/year



Residential fuel cell

CCS system



Commercialization of CCS

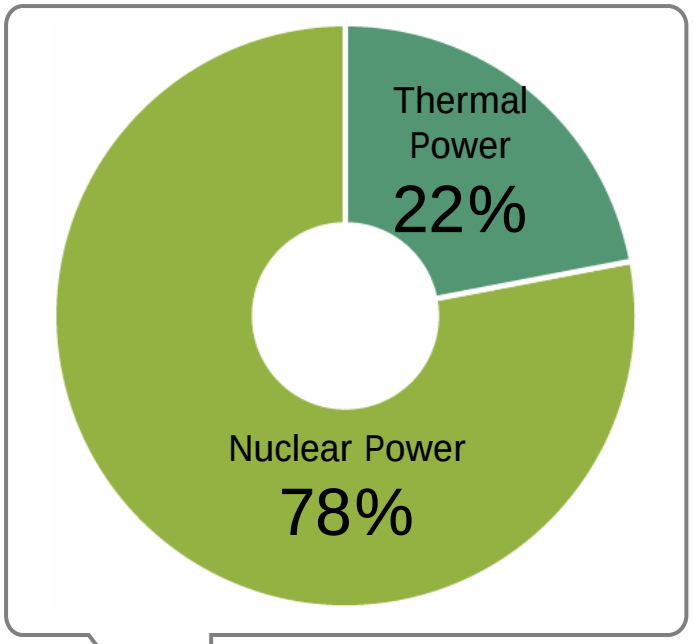
Reduce CO_2 emissions to zero by combining CCS and A-USC

CCS is an innovative concept to reduce CO_2 emissions from thermal power plant dramatically. CO2 is separated, captured, and stored under ground.

Volume of CO_2 reduction per unit: 5m tons/year

Achievement by Energy Approach

Reduction of CO_2 emissions in energy supply: target figures



Reduce CO_2 emissions through innovations in energy technologies

FY2006	FY2010	FY2025
4.2 million tons CO_2/year	14 million tons CO_2/year	47 million tons CO_2/ year

*Figures based on average emissions from design to operations, by fiscal year, and on comparison with similar commissioned equipment in FY2000 benchmark, i.e. coal-fired thermal plant

Eco Products Approach

Two areas that must be addressed

- Creation of new value (sustainable growth)
- Symbiosis with the Earth (Improving the global environment)

Eco-efficiency solution

- More productive lives
  - Safer and more comfortable life
- Mitigation of climate change
  - Optimization of resources
  - Management of chemicals

Contribute to sustainable development in diverse ways as a "Corporate Citizen of Planet Earth"

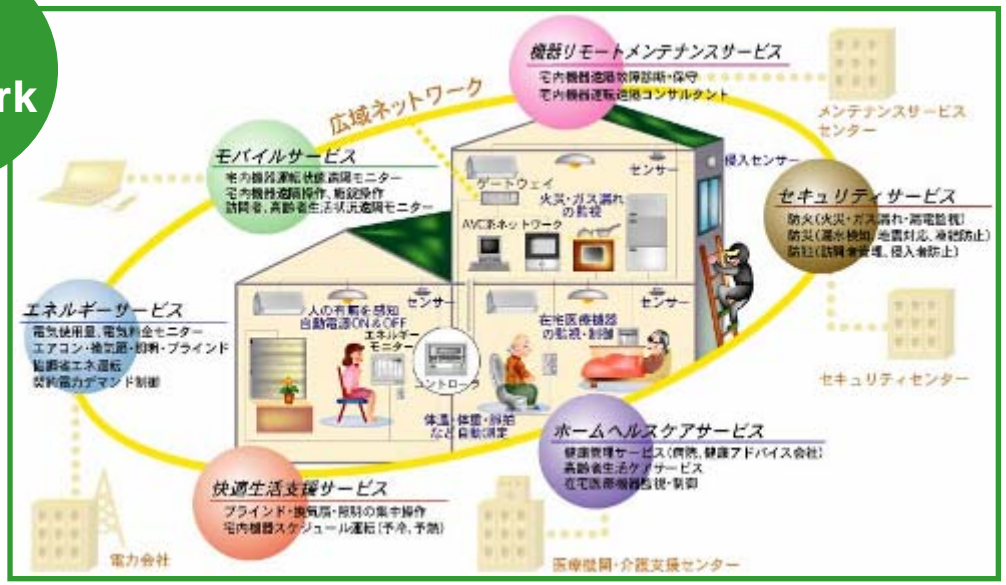
Eco-products create value that helps to overcome environmental problems.

Eco Products Approach

	Process Innovation	Value Innovation
Technologies that change lifestyles	**Energy management** (HEMS, BEMS, Environmental impact display system) **Diagnosis of energy saving** (Refrigerator stock control, Measuring CO_2)	**Universal communication** (Virtual display, Producing highly realistic visual space, Body sensor) **Home guard system** Active consumer control, Demand forecast
Products that pursue efficiency	**High efficiency lamp** (LED, Organic EL) **High efficiency air-conditioning** (Heat pump) **High-efficiency kitchen** (Cooker) **High-insulation, Highly airtight houses/buildings** (Vacuum insulating, High endurance construction materials)	**New lamps** (Use of naatural sunlight, light-storage Biochemical synthesis) **Super high insulation, Highly airtight houses/buildings** (Active adjustment construction materials) **New kitchen** (New processing technology, Long preservation, Normal temperature preserved food)
Technologies that support products	**High performance Devices** (SiC, GaN, Diamond Semiconductor) **Energy-saving model network** **Large capacity, optical communication**	**Common power supply, Standby power control** **Energy-saving network communication** **Grid/Quantum computer** **Single electron transistor**

EcoProducts Process Innovation

Home Network



E-CORE
高効率LEDダウンライト［イー・コア］

High efficiency LED lamp

Home laundry
with air-conditioning

PDA with DMFC

SpursEngine

Qosmio with SpursEngine

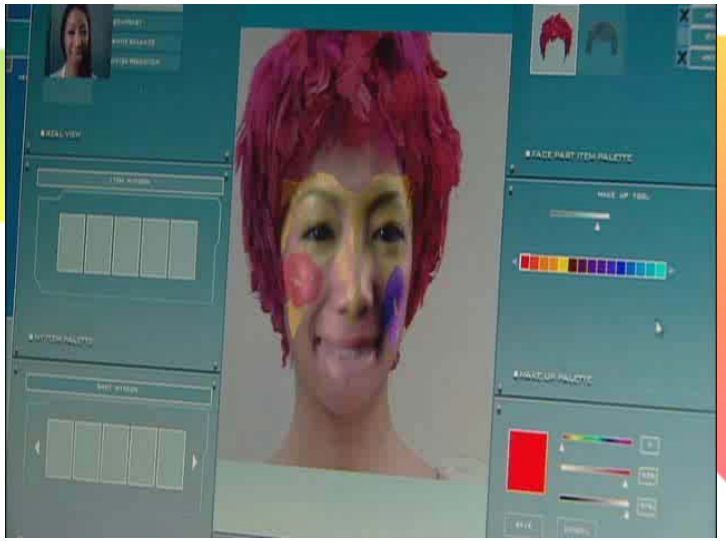
Eco Products Value Innovation

Media Streaming Processor

SpursEngine

New User Interface

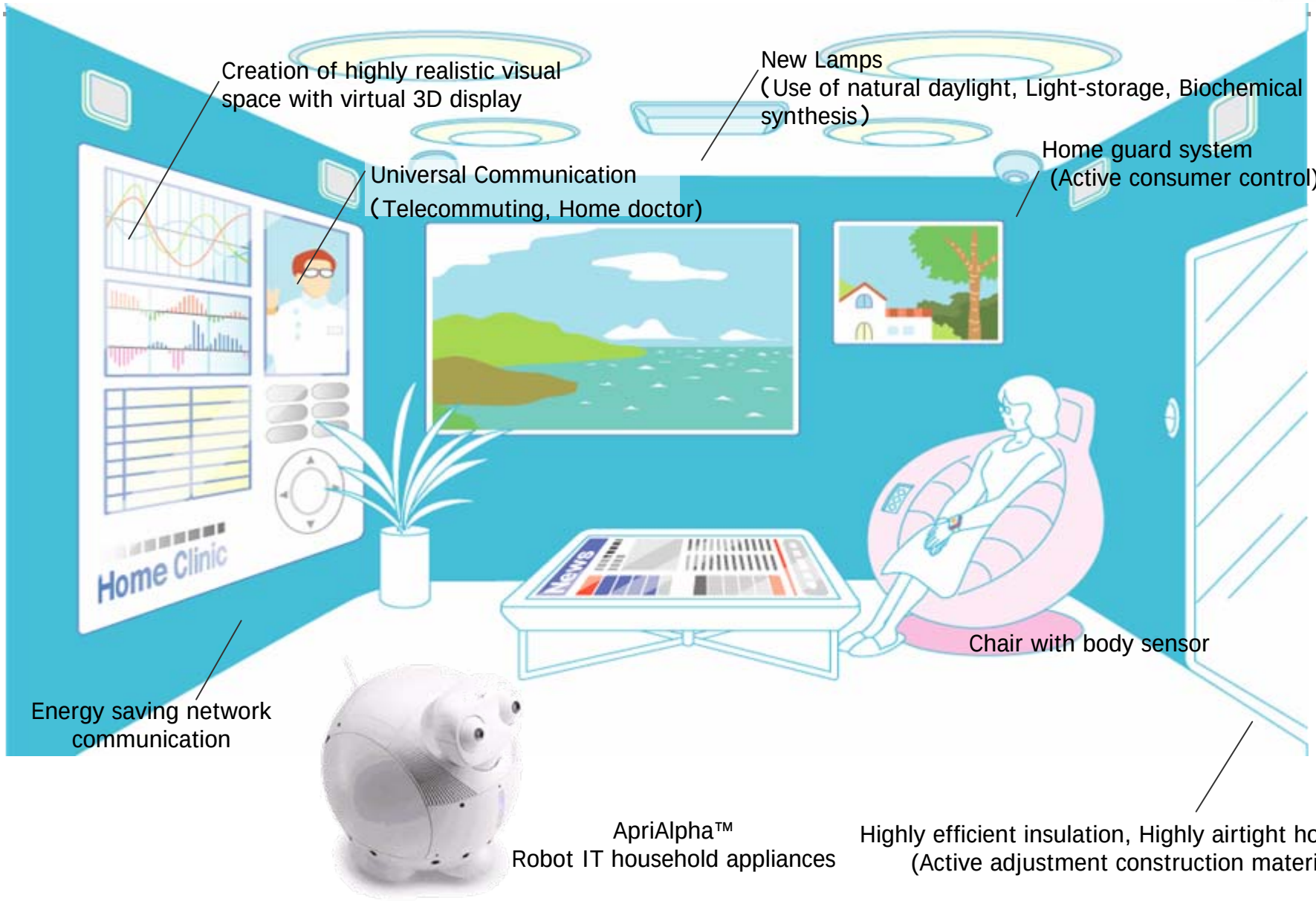
Image Indexing



High-Speed Image Processing

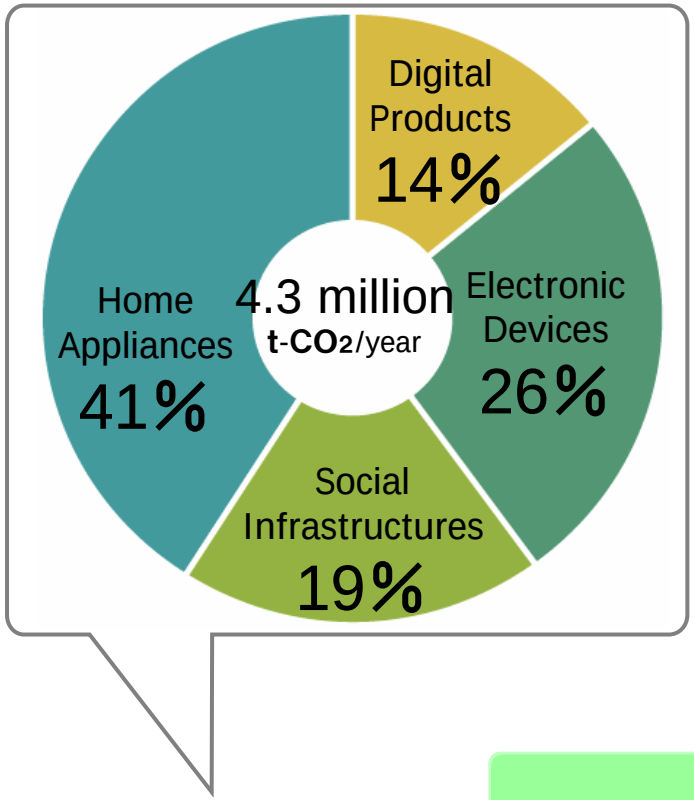
High-quality Image Technology

Eco Products Value Innovation



Achievements of EcoProducts Approach

Reduction of CO2 emissions in products: target figures



Reduce CO_2 emissions through innovations in eco friendly products

4.3 million t-CO_2/year — FY2006

6.3 million t-CO_2/year — FY2010

10.6million t-CO_2/ year — FY2025

*Comparison based on product lifecycle of main products in each category against equivalent products in FY2000 benchmark.

Towards Environment Vision 2050

2006 → 2010 → 2025

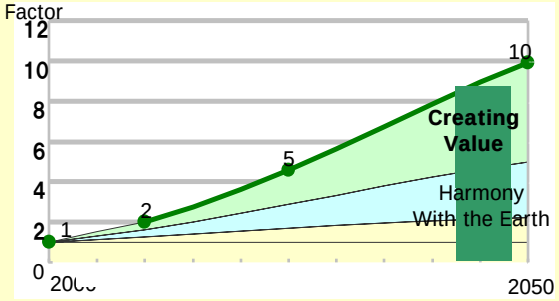
Contributions by Energy Approach

4.2 million tons CO_2 /year → 14 million tons CO_2/year → 47 million tons CO_2/year

Contribution by Products Approach

4.3 million tons CO_2/year → 6.3 million tons CO_2/year → 10.6 million tons CO_2/year

Environmental Vision 2050



Factor 10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