Key Technologies for Achieving Green Innovation

Reference document

1. Widespread practical introduction/ overseas expansion phase

Household use

Widespread introduction in Japan

* Direct overseas roll-out possible for some products

Commercial use

- Electric vehicles (EV)
- Hybrid/plug-in hybrid vehicles
- Organic EL
- Solar power generation
- Stationary fuel cells
- Heat pumps (including inverter control)
- LED lighting
- Lithium ion batteries
- Nickel hydrogen batteries
- Energy-saving home appliances
- Green IT (energy-saving IT devices, environmental IT solutions)
- Eco-housing
- Sodium sulfur (NaS) batteries
- Cogeneration
- Green logistics
- High-efficiency electric motors
- High-efficiency boilers
- High-efficiency industrial furnaces
- High-efficiency reaction processes (membrane separation, catalysts, etc.)
- Geothermal power generation
- Power generation from waste
- Power generation using waste heat
- High-efficiency production processes (process improvement)
- super coke oven

Overseas expansion/ collaboration

- Nuclear power generation
- High-efficiency thermal power generation (operation and maintenance, clean coal)
- Use of biofuels
- Modal shift to railways (including bullet train)
- Water-related technologies
- Hydroelectric power generation (including micro hydroelectric power generation)
- Power transmission and distribution
- Insurance supporting environmental business, assistance and loans for introduction of environmental facilities, etc.
- Soil remediation

Regulatory reform

- Wind power generation
- Waste recycling (simplification and speeding up of administrative procedures, etc.)

2. Trial / Verification phase

Standardisation

- Japanese-version smart grid system (smart meters, accumulator modules, etc.)
- Energy management systems (HEMS, BEMS, FEMS, CEMS, etc.)
- Infrastructure for EV usage (communication link between vehicle and regular recharging infrastructure, rapid-charge connectors, safety of in-vehicle batteries, etc.)
- High-efficiency superconductor power transmission
- Power consumption measurement methods (including products)
- Methods of assessing solar power generation performance
- Methods of assessing stationary fuel cell performance
- Methods of calculating product-level GHG emissions (including methods of calculating environmental contribution)
- Intelligent transportation systems (ITS) (CO_2 monitoring systems)
- Methods of measuring CO_2 emissions
- Thermal characteristics of waste-derived fuels (RDF, RPF)
- Performance of bioplastics

Trials / Verifications

- Infrastructure for hydrogen utilization
- Fuel cell vehicles
- Clean fuel (DME, etc.) vehicles
- Model system for modal shift to bicycles
- CO_2 capture and storage (CCS)
- Multipurpose heat pumps
- Eco compact city model systems

3. R&D phase

Applications

- Fuel cell/gas turbine (FC/GT) hybrid thermal power generation
- Integrated coal gasification combined cycle (IGCC) thermal power generation
- Integrated coal gasification fuel cell combined cycle (IGFC) thermal power generation
- Solar thermal power generation
- Fast reactors (nuclear power)
- Small- and medium-sized nuclear reactors
- Advanced ultra-supercritical pressure (A-USC) thermal power generation
- Next-generation air conditioning (comfortable, advanced -function, etc)
- High-efficiency hydrogen production equipment (using petrochemical gas)
- High-efficiency solar power generation
- Power electronics (SiC, GaN devices)
- Closed-loop-recycling of plastics
- Biochemicals (biomass-derived polymers, chemical synthesis from inedible biomass, etc.)
- Water treatment (innovative separation membranes, etc.)
- Ultra-high efficiency heat pumps
- Biomass fuel cells (stationary)
- New-type secondary batteries (post-lithium, etc.)
- Gas turbine/fuel cell (GT/FC) combined power generation (stationary fuel cells)
- Fuels using marine biomass
- Innovative energy-saving technologies for transportation machinery (including materials and design technologies)
- Next-generation light water reactors
- Power electronics (diamond devices)
- Direct reduction steelmaking processes
- New-structure/new-material solar cells
- Rare metal substitution technologies (next-generation motors, secondary battery materials, etc.)

R&D

- Artificial photosynthesis (e.g., production of methanol from CO_2)
- Solar power generation in space
- Nuclear fusion

Basic research