

Material and Energy Co-production

Material and energy co-production systems would be constructed by radically reviewing and restructuring both materials and energy production systems. The co-production system would change the industrial structure into one that consumed less energy and realized diverse values of the various products, including energy.

- Production of energy and eco materials from biomass resources (Biomass refinery)
- Sustainable petroleum refining and integration of petrochemicals
- Iron-making process with parallel production of hydrogen
- Food production with complete recycling of energy and materials in crop factories

Sustainable Manufacturing

Manufacturing high-performance nanotechnology materials. Developing manufacturing and processing technologies for innovative materials would contribute to the effective utilization of energy and CO₂ reduction.

- Sustainable carbon cycle chemistry
- Manufacturing high-performance materials using nanotechnology
- Green technology based on eco-design

Sustainable Energy Resources Development

Diversification of energy resources would realize energy security by establishing a reliable yet flexible supply and demand structure.

- Developing a diversity of energy resources
- Sustainable carbon cycle
- Utilization of unconventional fossil fuels

Creating a Recycling-Oriented Society

Social infrastructure and systems that recycle energy and materials would be constructed to overcome resource and environmental constraints. Aiming for:

- Sustainable urban environments
- Systems recycling energy and materials
- Recycling system of scarce resources
- Systems for the cooperative recycling of energy, materials, and water

Efficient Zero-Emission Energy Supply System

Renewable energy systems and other innovative energy conversion technologies would be developed to reduce CO₂ emissions in the energy conversion industrial sector.

- Highly efficient energy conversion technologies such as large scale fuel cells
- Renewable energy systems
- Carbon dioxide capture and storage
- Hydrogen-fired combustion turbines
- Secure and safe nuclear fuel cycle

Environmentally Friendly Transportation System

New transportation systems that reduced dependence on fossil fuels would be constructed and efficient vehicles developed. Intelligent transportation systems utilizing information technologies would contribute to the realization of safe and secure transportation.

- Environmentally friendly intelligent transportation systems
- Development of low emission vehicles such as those using fuel cells, and plug-in hybrid electric and electric vehicles
- Alternative transportation fuels from biomass resources

Sustainable Life

Energy conservation technologies and innovative materials for use in the residential and commercial sectors would be developed to realize a sustainable and comfortable life.

- Autonomous, distributed, and cooperative energy systems
- Air conditioning and water heating systems using highly efficient heat pumps
- Energy-saving electronic devices
- Next generation energy saving display and illumination systems
- Energy saving houses and buildings

PRODUCTION

Grand Design and Strategy for Sustainable Development

A grand design and a strategy for sustainable development would be developed and an autonomous decentralized system globally optimized. As concentration and decentralization would be assessed. This would involve:

- Energy and industrial strategies
- Energy resource economics
- Assessment of energy systems
- Risk management
- Technology roadmap with scenario analyses

UTILIZATION

RECUPERATION