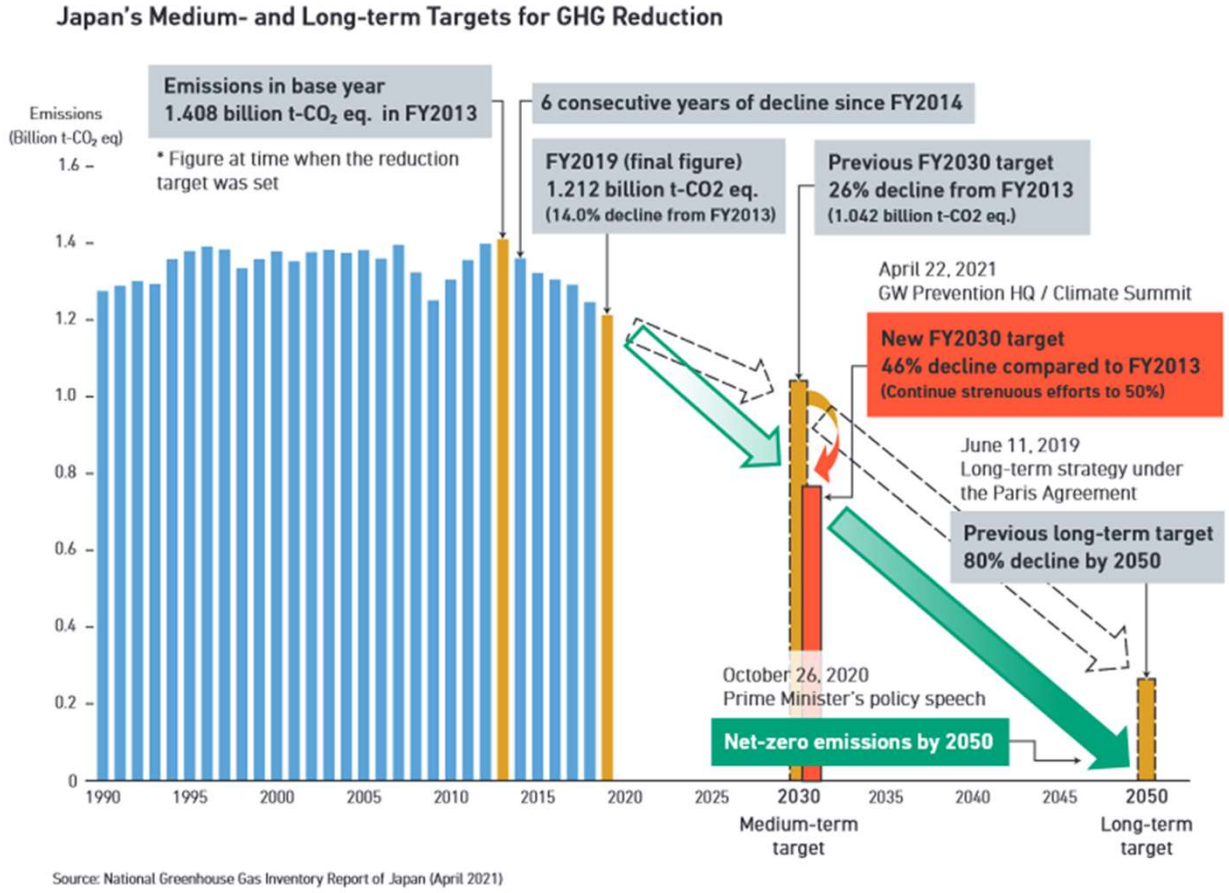
Japan's Green Transformation (GX) Investment Policies and Implications for EU Companies

Johanna Schilling

Table of Contents

Overview on GX Strategy



"Basic Policy for the Realization of GX":

- To contribute to global decarbonization through the realization of GX and
- To strengthen Japan's industrial competitiveness and economic growth.

Japan's Green Transformation (GX)

Target Areas

Renewable Energies

CCS

Next Generation Innovative Reactors

Next Generation Network

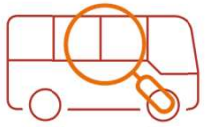
Hydrogen/ Ammonia

Battery Industry

Source: METI, 2023

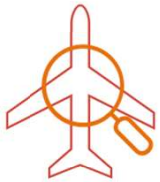
Japan's Green Transformation (GX)

Target Areas



Transportation

Automotive Industry



Aircraft Industry

Zero Emission Ships

Cement Industry

Carbon-recycled fuel

Infrastructure

House/Building

Source: METI, 2023

Japan's Green Transformation (GX)

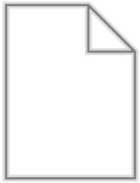
Target Areas

Resource Recycling

Bio Plastic

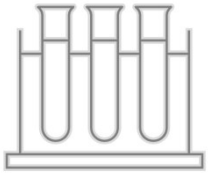
Local Community

Investment for Digital



Pulp & Paper Industry

Steel Industry

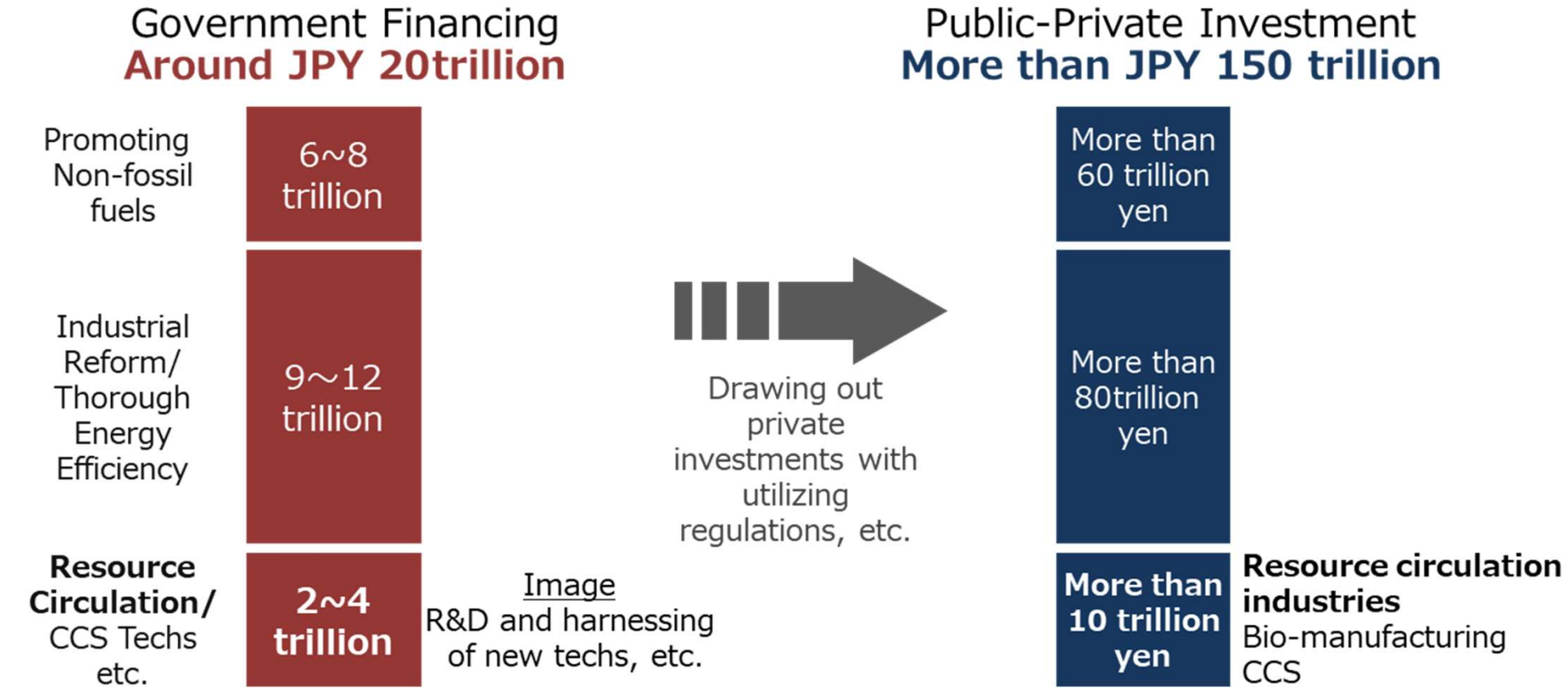


Chemical Industry

Food, Agriculture, Fishery Industry

Source: METI, 2023

GX Financing Plan



Source: METI, 2023

Japan's Green Transformation (GX)

Japan

INITIAL INVESTMENT PLAN

Focus	Approx. 17 Trillion JPY (Annual)	150 Trillion JPY investment in 10 years Examples of planned investments	Investment Cost
Decarbonisation of power supplies	5 Trillion JPY (Annual)	• Renewable energy (Implementation through FIT/FIP framework) • Hydrogen, Ammonia (Investment in infrastructure development) • Battery production (For vehicles and fixed-ground use)	2 Trillion JPY 0.3 Trillion JPY 0.6 Trillion JPY
Decarbonisation of manufacturing processes	2 Trillion JPY (Annual)	• Decarbonisation of manufacturing processes (e.g., Next-generation manufacturing process technology, carbon neutral power generation facilities) • Installation of industrial heat pumps and cogeneration facilities	1.4 Trillion JPY 0.5 Trillion JPY
End-use sector	4 Trillion JPY (Annual)	• Introduction of energy-efficient homes and buildings • Introduction of next-generation vehicles	1.8 Trillion JPY 1.8 Trillion JPY
Infrastructure development	4 Trillion JPY (Annual)	• Grid reinforcement cost (Masterplan) • Automobile infrastructure development (Charging station, Hydrogen station) • Digital society infrastructure developments (Semiconductor manufacturing facilities, data centers)	0.5 Trillion JPY 0.2 Trillion JPY 3.5 Trillion JPY
R&D	2 Trillion JPY (Annual)	• Carbon recycling (e.g., CCS, methanation, synthetic fuel, SAF) • Development of carbon-neutral manufacturing processes (e.g., hydrogen reduction steelmaking). • Nuclear (R&D on next-generation nuclear plants) • Implementation of advanced CCS projects	0.5 Trillion JPY 0.1 Trillion JPY 0.1 Trillion JPY 0.6 Trillion JPY

Source: GR Japan, 2023

GX Financing Plan

Initiatives for achieving 150 trillion JPY of private-public investment

1. Growth-oriented carbon pricing (including GX transition bonds)
2. Integrated regulatory/assistance promotion measures
3. New financing methods
4. International development strategy, including formation of Asia Zero Emissions Community
5. Development of GX League (forum for cooperation between companies, government and academia)

Source: METI, 2023

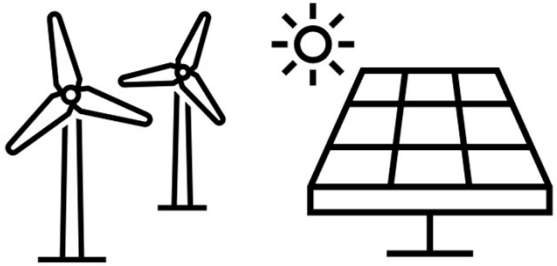
GX League

- Network of more than 560 Japanese companies that are committed to:
  - Voluntary emissions reduction with clear targets for 2030 and a roadmap for carbon neutrality by 2050
  - Leading decarbonisation of the supply chain
  - Supporting creation of green markets through green procurement

https://gx-league.go.jp/en/

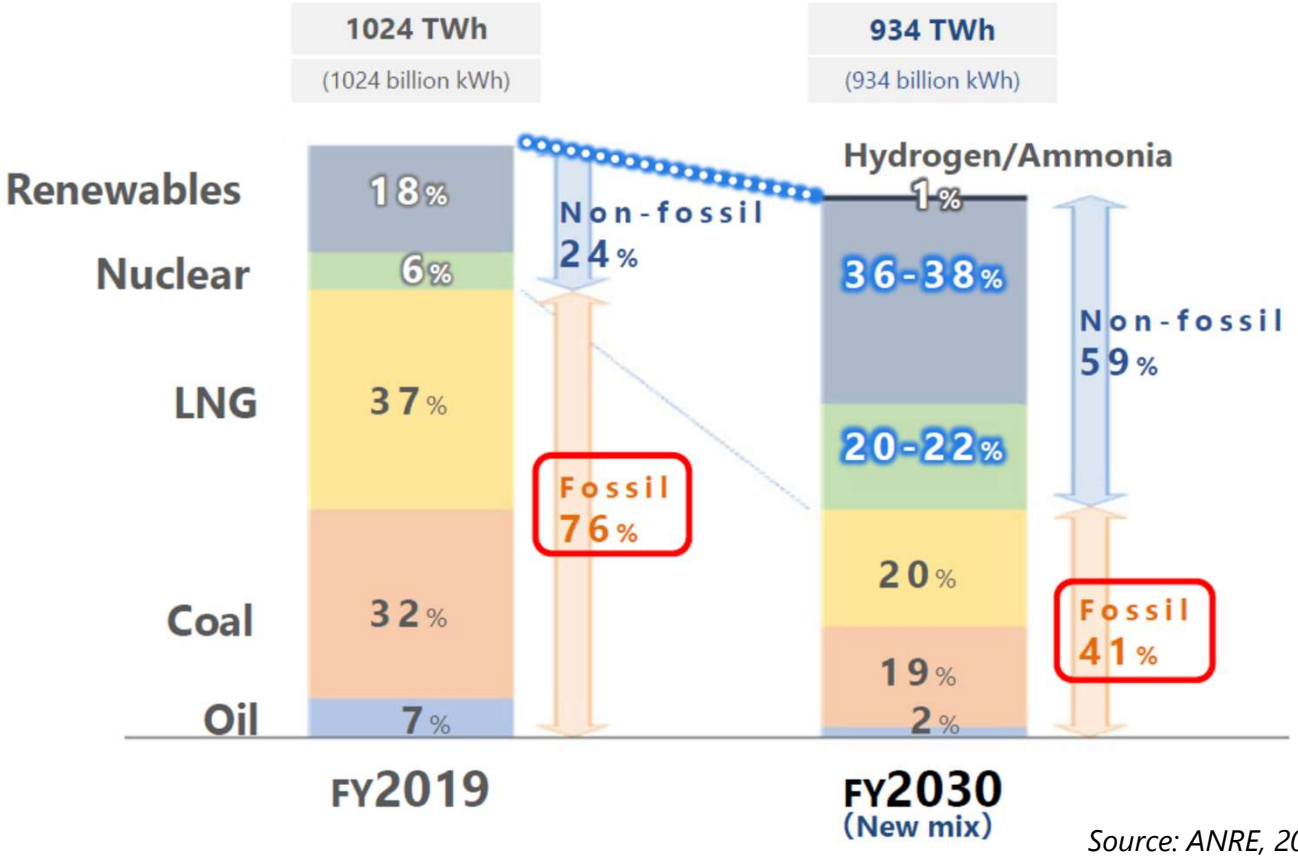
Table of Contents

1. Renewable Energies (Photovoltaic, Wind Power)



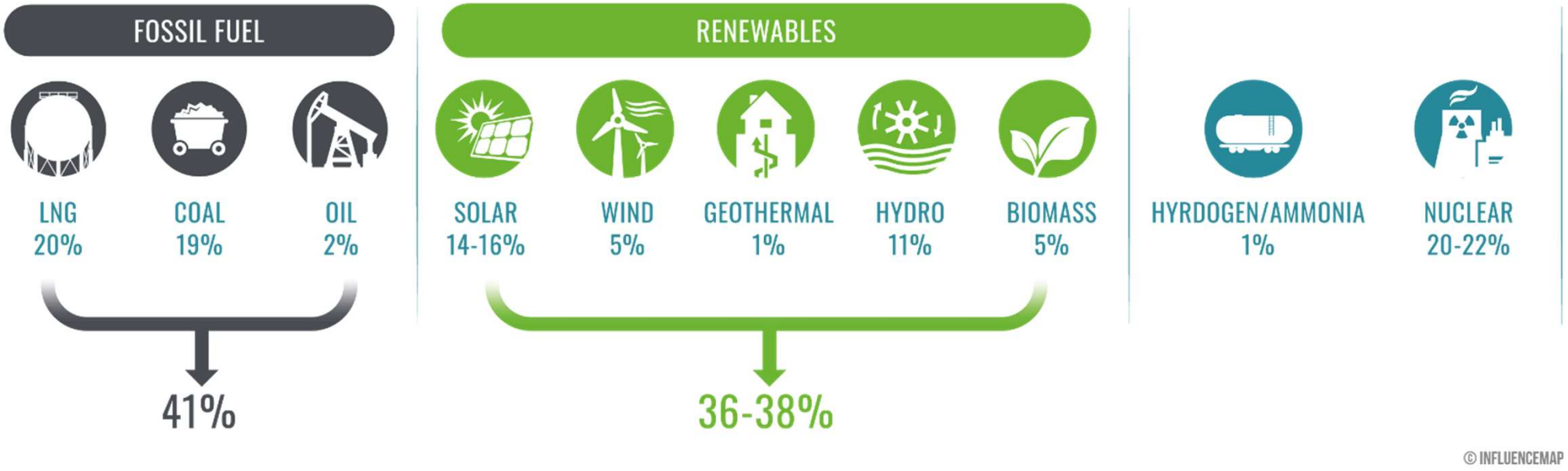
Japan's Green Transformation (GX)

6th Basic Energy Plan



Source: ANRE, 2021

Renewable Energies: Targets (2030)



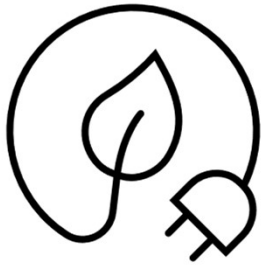
Renewable Energies: Challenges

- Limited space for onshore wind power and mega solar plants
- Water depths and fishing rights
- Grid limitations
- Restrictions on the use of hot springs for energy supply

Renewable Energies: Potentials

- Technologies and components for wind turbines and floating turbines
- Innovative, next-generation battery cells, fuel cells and PV technology
- Energy management systems for integrating intermittent renewable power sources

2. Energy Storage



Energy Storage: Targets

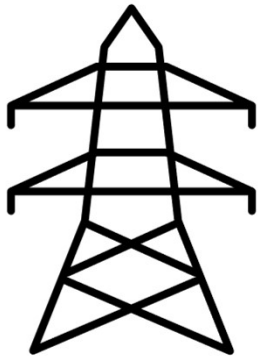
By 2030:

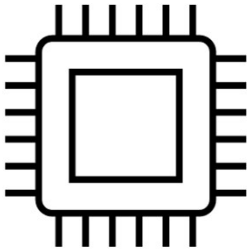
- Cumulative installation of approximately 24 GWh for the total of home-use and business/industrial-use storage batteries

Energy Storage: Potentials

- Innovative, next-generation batteries, including
  - Lithium-ion
  - Nickel-based batteries
  - Redox-Flow batteries
  - NAS batteries

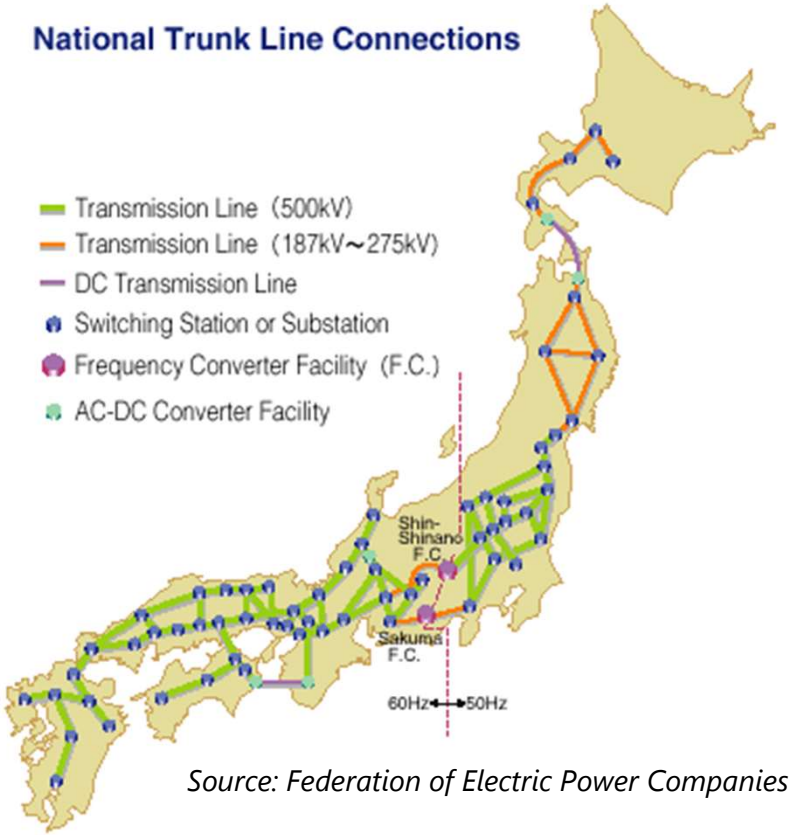
3. Smart Grids/VPP





Smart Grids/VPP: Challenges

- Lacking grid connections
- Different frequencies
- Increasing fluctating energy supply



Source: Federation of Electric Power Companies Japan

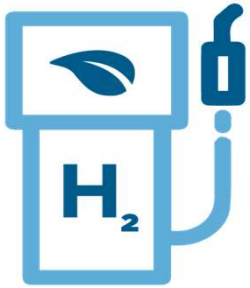
Smart Grids/VPP: Targets

- „Next generation grid"
- Regional Energy Management Systems (REMS) and Virtual Power Plants (VPP)
- „Capacity market"

Smart Grids/VPP: Potentials

- Smart grid related technologies and systems such as:
  - Batteries
  - Smart metering
  - Energy management systems
    - Real-time monitoring systems (tracking systems)
    - Demand response systems
    - Virtual Power Plant (VPP)

4. Hydrogen



Hydrogen: Targets

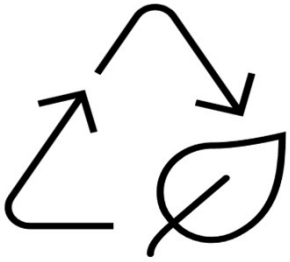
By 2030:

- Hydrogen market of 3 million tons per year
- 1,000 hydrogen stations
- 800,000 fuel cell vehicles in use
- 1,200 fuel cell buses
- 10,000 fuel cell forklifts
- 5,3 million residential fuel cell units

Hydrogen: Potentials

- Technologies for CAPEX and OPEX reduction for electrolysers & water electrolysis
- Energy management systems that optimize the hydrogen production with RE
- Hydrogen transportation & storage technologies
- Hydrogen powered turbines
- Ammonia production units
- FC trucks
- Stationary fuel cells
- Technologies for „green" steel production

5. CCS/CCU



CCS/CCU: Targets

- Cut CO2 emissions in hard-to-abate sectors such as the steel industry by 30% by 2030
- Transform existing thermal power generation (by coal) into zero-emission power generation
- Build a CCUS value chain and capture 120-240 million tonnes of CO_2 by 2050

CCU/CCS: Potentials

- CCS/CCU related technologies such as:
  - Direct air capture
  - Technologies for transport, storage and reuse
  - Carbon-neutral fuels
  - CO_2 electrolysis

6. Transport & Mobility

Transport & Mobility: Targets

- Electrification of transport
  - Passenger vehicles: EV share of 100% of new vehicle sales by 2035
  - Commercial vehicles: EV share of 20-30% of new light vehicles sales by 2030 and EV and „decarbonized fuel" vehicles accounting for 100% by 2040
  - Heavy vehicles: advanced introduction of 5,000 vehicles in the 2020s and full electrification by 2030
  - 150,000 EV chargers (incl. 30,000 fast chargers) by 2030

Transport & Mobility: Targets

- Hydrogen-fuelled mobility
  - 1,000 hydrogen stations in optimal locations by 2030
  - 800,000 fuel cell vehicles in use by 2030 and 2-3 million by 2040
  - 1,200 fuel cell buses in use by 2030

© 2024 SAUDI RESEARCH & PUBLISHING COMPANY

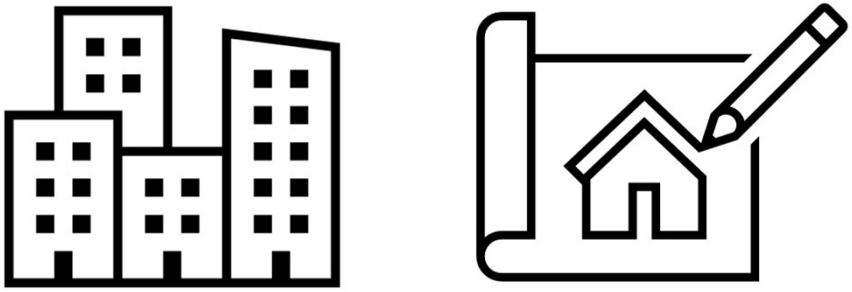
Transport & Mobility: Targets

- Sustainable aviation & ship fuel
  - Cut CO_2 emissions in shipping industry by 1.8 million tonnes by 2030 through introduction of ammonia/hydrogen-fuelled ships
  - Develop carbon neutral fuels for shipping and aviaction sectors by 2050
- Mobility as a Service (MaaS)

Mobility: Potentials

- Light-weight material for EV, aircrafts, and ships
- Innovative, next-generation EV batteries
- Innovation for bio-based fuels and SAF (sustainable aviation fuels)
- Electric vehicle chargers
- MaaS (Mobility as a Service) solutions

7. Housing & Construction



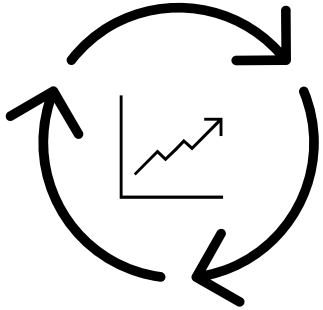
Housing & Construction: Targets

- All new-built houses will be „zero emission houses" (ZEH) by 2030
- „Smart Houses"
- Promotion of energy-saving renovation & improvement of energy-saving performance
- supply of carbon neutral cement (2 million tonnes by 2030)
- Establishing technology for constructing high-rise wooden buildings through the development of wooden building materials and standardization of construction methods

Housing & Construction: Potentials

- Insulation material and windows
- Innovative sustainable building material with low carbon footprint regarding the whole life cycle
- Innovations for carbon-neutral cement or alternatives to cement
- Innovative wooden building materials (also for high-rise buildings)
- Efficient and sustainable home air conditioning systems
- Innovative energy-efficient lighting systems

8. Circular Economy



Circular Economy: Targets

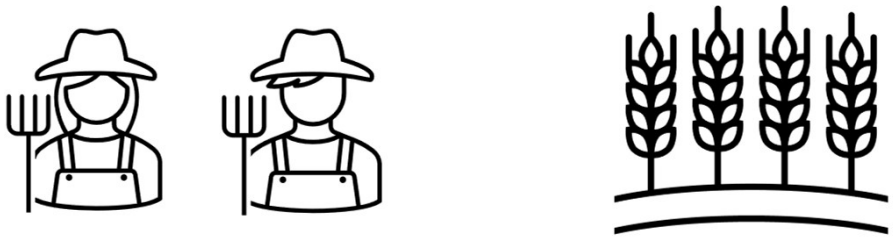
- "Strategy of Resource-Autonomous Circular Economy for Growth":
  - Reduce
  - Renewable
  - Reuse
  - Recycle
  - Recovery

- CE related technologies market of 80 trillion yen in 2030
- In 2035: Domestic market for recycled plastics and materials of 504 billion yen

Circular Economy: Potentials

- Highly functional biobased materials
- Advanced technologies and mechanisms for waste sorting
- High-performance materials and recycling technologies
- Development of new materials to replace plastics
- Technologies for recovery of CO_2 from waste treatment facilities
- Technology for waste heat recovery
- Improvement and cost reduction of heat storage and transportation technologies

9. Farming & Food Production



Farming & Food Production: Targets by 2050

- Complete shift to horticultural facilities that do not use fossil fuels, e.g., through the development of heat pumps
- Establishing technology for next-generation organic agriculture, and increasing in organic farming to 25% of farmland
- Establishing technologies for the electrification/digitization of agricultural and forestry machinery

Farming & Food Production: Targets (by 2050)

- Establishing a cyclical use of "harvesting, using, and planting" for planted forests, and promoting reforestation using F1 plus trees and increased use of wood
- Establishing a method to measure the amount of CO_2 absorbed and stored by blue carbon, and aiming to reflect it in the UN Framework Convention on Climate Change and others

Agriculture & Food: Potentials

- ICT and smart farming technologies
- Smart farming services
- Technologies and solutions to realize the shift from fossil fuels in horticultural facilities
- Technologies for next-generation organic agriculture

Kubota, 2024

Table of Contents

Challenges

- Public tendering
- Market can be complex for foreigners
- Competition from Japanese companies
- Regulations regarding safety of use and technical standards
- Time & long decision-making processes
- Language barrier

Recommendations

- Ensure sufficient time and human resources
- Utilize supporting organizations
- High quality and an after-sales-service
- High quality products and services
- Highlight EU origin
- Select reliable partners
- Build strong customer relationships
- Build local networks
- Use Interpreters
- Attend important trade fairs

Conclusions

- Japan's Green Transformation will spur the market for various technologies such as energy, circular economy, sustainable housing and smart farming.
- Public tendering is a big challenge.
- Thorough market analysis and cooperating with local partners is recommended.

Question and Answer session

Expert contact

Johanna Schilling
ECOS GmbH
Osnabrueck/Germany
jschilling@ecos.eu

Co-funded by the European Union

The EU-Japan Centre for Industrial Cooperation is co-funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Innovation Council and SMEs Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.