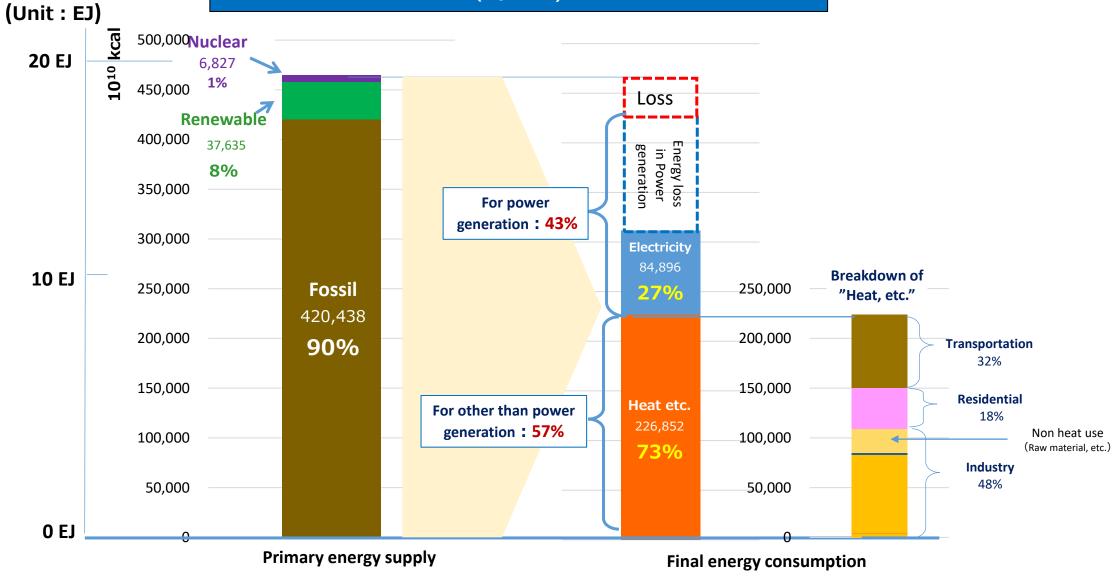
De-carbonization of energy and heat in Industry sector

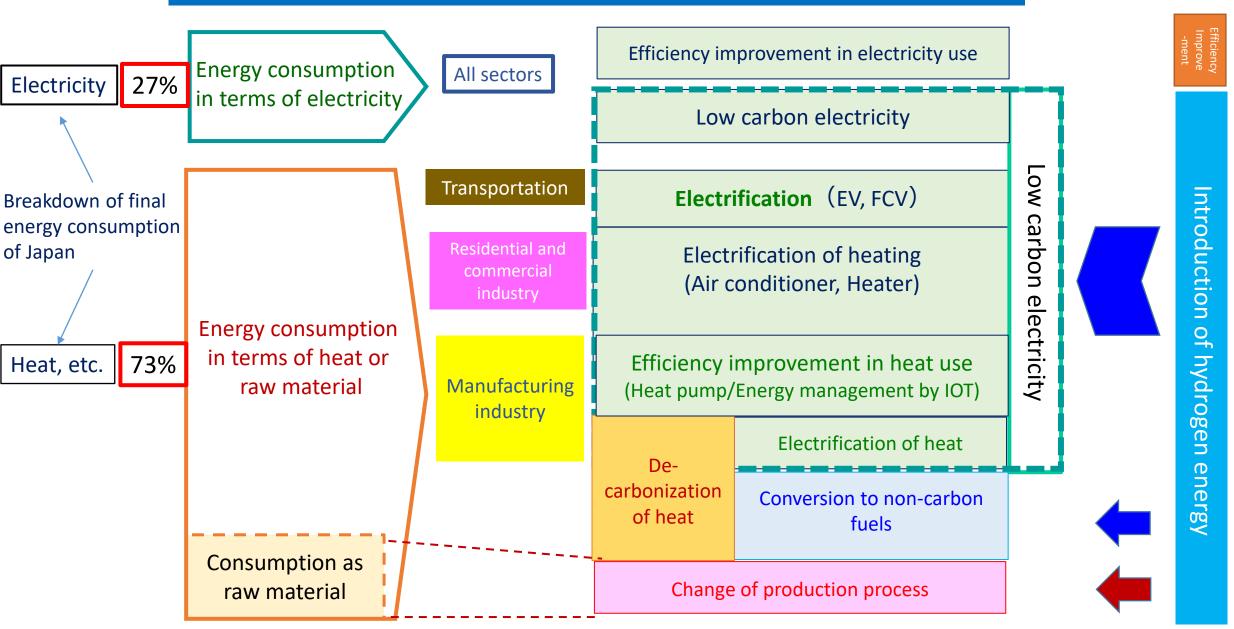
April 21, 2021

Bunro Shiozawa

Innovation Strategy Coordinator (Energy management)
"Energy systems of an Internet of Energy (IoE) society"
Cross-Ministerial Strategic Innovation Promotion Program (SIP)
Cabinet Office of the Japanese government

Energy supply and demand structure of Japan (2017FY)





De-carbonization of Energy and Heat De-carbonization scenario of an energy system in Industry Sector; Bunro Shiozawa (From Overseas) Ammonia (NH₃) 7 **(5) Efficiency improvements** 6 CO2 free through electrification Process changes in **Process changes** in hydrogen (3) Heat pump Steel industry* and energy **Energy Management** *Steel Industry Petro chemicals** Blast furnace Biomass fuels Electric arc furnace Hydrogen Heat, etc. Fossil +ccs fuels ■ Direct reduced iron-**De-carbonization** Heat, etc. electric arc furnace of heat ■ Hydrogen reduction **2** steel making Domestic renewables **Petrochemical Industry (excl. Bio) CO₂ Free Electricity Naphtha/ethane cracking electricity Electricity Nuclear De-carbonization ■ Chemical recycle of electricity Ammonia + Methanol

Final Energy Consumption

Present

Future

Secondary energy

Primary energy (De-carbonization)

based chemistry

1