

Efforts Toward Realization of a Carbon-Neutral, Green Society – All for One Earth –

K. HAYASHIDA

Vice Chief of Division, Research & Development Division



Introduction

This year 2021 marks the 100th anniversary of the founding of JTEKT's forerunner, Koyo Seiko. The Koyo name still lives on through Koyo bearings, which are highly sought after by users in many different industries. I'd like to express our heartfelt gratitude to all our stakeholders. We appreciate your continued support.

This issue of JTEKT Engineering Journal (No.1018E) is a special issue covering industry-related technology. It looks at areas such as machining and manufacturing technologies for industrial machinery bearings and other components. This issue is also the first online-only version of the journal. We have decided to discontinue the paper version starting with this issue in response to today's greater concern for the environment. Thank you for your continued interest in JTEKT Engineering Journal.

Working to create a carbon-neutral green economy

In a general policy speech made in October 2020, Japanese Prime Minister Yoshihide Suga officially called for the creation of a green economy. Japan wants to reduce its greenhouse gas emissions to net zero by 2050—the goal is to have attained a carbon-neutral decarbonized economy by that year. Japan's efforts toward a green economy are gaining momentum, with prime minister Suga's call to action followed by a number of developments in rapid succession. For example, the Ministry of Economy, Trade and Industry released a green growth strategy for carbon neutrality by 2050, while the Act on Promotion of Global Warming Countermeasures was amended in May this year.

Now I'd like to discuss how environmental issues relate to entropy. The law of entropy (the second law of thermodynamics) states that every time energy is transformed from one state to another, the available energy needed to do some work in the future is lost.

Entropy is the degree to which energy can no longer be converted into work. Let's look at primary energy sources. Fossil fuel-derived energy sources such as petroleum and coal are burned and consumed, ending up as unusable energy in the form of waste products and waste heat. The greenhouse gas (CO₂) held to be responsible for global warming is one of the high-entropy waste products. Low-entropy substances should be used efficiently, and high-entropy waste products recovered or reused. But solar and other renewable energy sources only enable intermittent use and have low entropy. Solar power produces no CO₂ waste (the main greenhouse gas), making it very promising as an environmentally friendly energy source. It is one of the energy sources for which mass adoption could be foreseen.

As plant owners, manufacturers like JTEKT will inevitably need to work on reducing CO₂. The entropy considerations described above mean that the key technologies for achieving carbon neutrality will be renewable energy-based technologies for production, storage, and use of CO₂-free hydrogen, along with CCUS (carbon capture, utilization and storage) technologies for handling CO₂ emitted from plants. JTEKT is looking to research and develop these technologies to enable their practical application. LCA (life cycle assessment) is a methodology that examines product manufacture, transport and use starting from the resource-gathering phase and ending with the return of waste products back to the planet. JTEKT wants to use this approach in product development. By applying the 3Rs (reduce, reuse, recycle) to design and development, we are looking to make our resource use more streamlined and effective through measures such as saving energy, reducing size and weight, extending product life, and maximizing reductions in materials and parts. Naturally, we also want to continue our steady efforts to reduce CO₂ from manufacturing sites and manage environmentally hazardous substances while complying with chemical regulations.

The economy and the world will no doubt change

in highly unpredictable ways over the next 30 years as Japan works to create a green economy by 2050. There will likely be challenging obstacles to overcome when balancing the needs of the environment and the economy. But JTEKT is resolutely committed to developing new technologies that will benefit future generations and the planet that sustains us. This work will be designed to refine our awareness of environmental issues. It will help speed the path to a green economy while enabling collaboration among the public and private sectors along with local governments. Thank you for your continued support.

– All for One Earth –