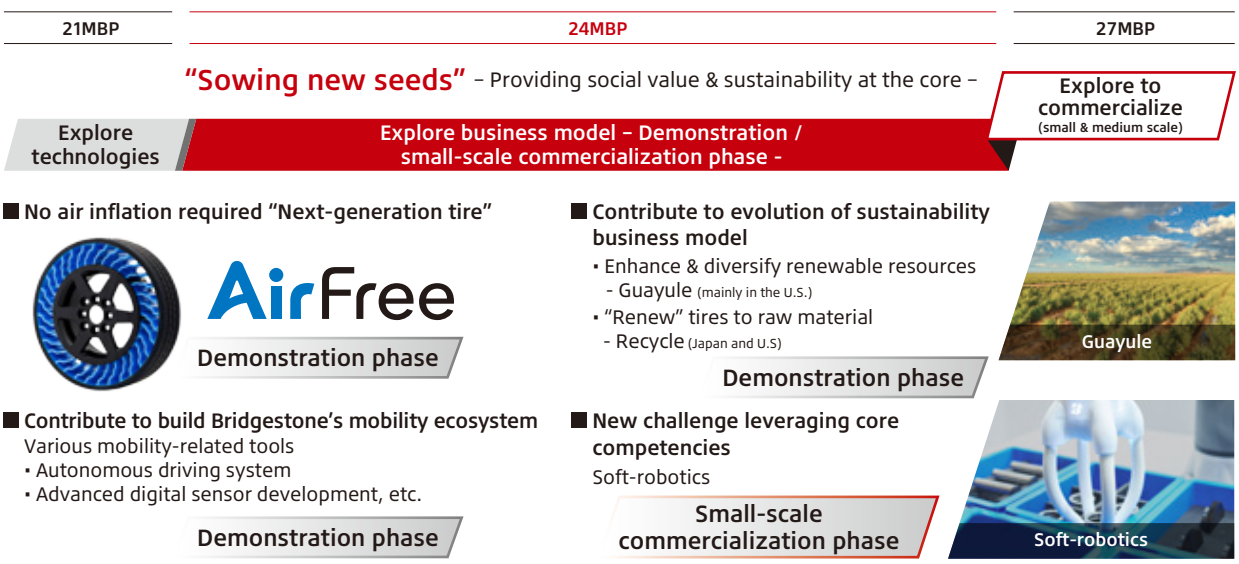
Exploratory Business: Sowing New Seeds

Bridgestone E8 Commitment: **Energy** | **Ecology** | **Ease** | **Empowerment**

In the exploratory business, which we have positioned as sowing new seeds for future sustainable growth, we start by providing social value with sustainability at the core. In the 21MBP, we first focused on exploration of technology. In the 24MBP, we promote the exploration of business models for the next stage, with co-creation as its axis.

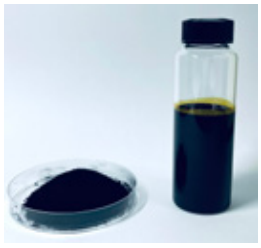


Guayule Business: Diversification of Natural Rubber Sources

In the U.S., we are promoting the guayule business to diversify natural rubber sources, a renewable material, through co-creation and open innovation with the U.S. Department of Energy, local NGOs, and external partners. Unlike the para rubber tree, the cultivation of which is geographically concentrated and is susceptible to disease and climate change, guayule can be grown in arid regions, making it a viable alternative to natural rubber. Cultivating guayule can also contribute to the greening of these arid regions. Development of guayule-derived tires, which was studied in the past in Firestone, was resumed in earnest in 2012. In 2022, we supplied race tires made from guayule-derived natural rubber at the NTT INDYCAR® SERIES, and demonstrated their performance. We will continue to take advantage of the NTT INDYCAR® SERIES under a concept of "mobile laboratory" to explore technologies for commercialization.

Recycle Business: "Renew" Tires to Raw Material

In the recycle business, which "renews" tires to raw material, we are promoting co-creation with ENEOS Corporation under the "Green Innovation Fund Project" of the New Energy and Industrial Technology Development Organization (NEDO), in Japan. We have been promoting elemental technologies development since 2021, and began recycle pyrolysis tests of end-of-life tires in 2023. During the 24MBP, toward its commercialization we are promoting technology verification and also start studying the construction of a pilot demonstration plant. In addition, we continue initiatives for recycling in the U.S. and for mining tires as well.



Recovered carbon black (left) and tire-derived oil (right)

Demonstration machine (Kodaira, Tokyo)

* Obtained as a result of work (JPNP21021) commissioned by the New Energy and Industrial Technology Development Organization (NEDO).

Soft-robotics: A New Challenge Leveraging Bridgestone's Core Competencies

In the soft-robotics business, which has become a corporate venture "Bridgestone Softrobotics Ventures" as opportunities for diverse talent, especially for young talent, to shine and place to demonstrate entrepreneurship, we are exploring business model based on co-creation with a wide range of partners to "realize a future where human and robot co-exist" under the slogan "Soften the Future".

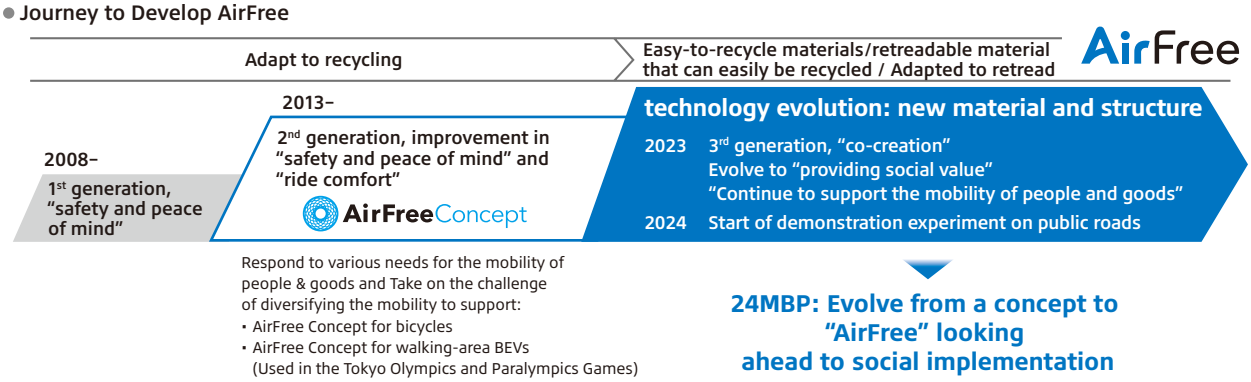
Soft-robotics is soft robot which utilizes artificial rubber muscles that leverage the know-how gained from the development and production of tires and hoses and are designed to work alongside humans. The "TETOTE" soft robotic hand, incorporating AI software from our partner, Ascent Robotics Corporation, makes piece-picking possible, successfully grabbing a variety of objects. "TETOTE" was awarded as the "2023 Good Design Award" by the Japan Institute of Design Promotion, and the concept model of the soft robotic hand won the "iF Gold Award" at the internationally prestigious "iF Design Award 2023". In addition, we are taking on new challenges such as presenting "umaru," a prototype of "robots that immerse your body and move your mind," at the International Robot Exhibition 2023. In the 24MBP, we will continue to evolve initiatives for the next phase of small-scale commercialization.

"umaru," A Prototype of "Robots that Immerse Your Body and Move Your Mind" at International Robot Exhibition 2023

"Next-Generation Tire" that doesn't Need Air-Filling: AirFree —Supporting Local Community—

As part of our efforts to sow new seeds in tires, we create value by evolving the AirFree Concept, into "AirFree", a "next-generation tire" that doesn't need air-filling, with a view to social implementation. Bridgestone has been uniquely developing the AirFree Concept since 2008, valuing sustainability such as leveraging materials that can be easily recycled, with our core competencies – resin material technology leveraging "mastering rubber" and the technology of "mastering road contact". Leveraging digital simulation technology and tire technology, we have evolved it to new material and structure. In 2023, we started a demonstration experiment for ultra small EVs through co-creation with Idemitsu Kosan. In addition, from 2024, we start demonstration experiments on public roads in the vicinity of Bridgestone Innovation Park in Kodaira, Tokyo. In the future, by pairing AirFree with automated driving, where tires become more important, we aim to solve mobility issues in local communities due to an aging population, rural depopulation, and limitations on movement caused by labor shortages.

● Journey to Develop AirFree



Expanding Our Mission: From Local Communities to Outer Space
Research and Development of Lunar Rover Tire

We leveraged the technology cultivated through "AirFree" for the research and development of lunar rover tires and developed a new second-generation tire.

In line with Bridgestone's fundamental principle of "Tires carry life," we are working on research and development of lunar rover tires from 2019. Bridgestone, which has known the roads around the world and has supported the evolution of all forms of mobility on Earth, now supports the evolution of space mobility from the ground up to the roads of outer space as the next stage. Bridgestone's technology innovations, which continue to support the evolution of mobility, has been refined in "extreme" environments such as motorsports. Through this project, we aim to become essential to the future of mobility by taking on the challenge of the new "extreme" environment of human activity, that is the surface of the moon.

In April 2024, we exhibited a second generation tire concept model for the first time at our booth within the "Japan's Space Industry" pavilion organized by the Japan Aerospace Exploration Agency (JAXA) at the 39th Space Symposium, the largest space-related symposium in the U.S., held in Colorado Springs, U.S.. By demonstrating Bridgestone's new challenge and pursuit of excellence to our partners, we gain their empathy to expand our space business network and create opportunities for co-creation with various partners in Japan and overseas.

Currently, a lunar rover equipped with Bridgestone tires is expected to start operation on the moon after 2031, which is the 100th anniversary of Bridgestone. We are enhancing our technology innovation, and aiming to keep empowering the mobility of people and goods with safety and peace of mind from the ground up toward our 100th anniversary.

"Tires Carry Life": Supporting All Forms of Mobility, from Local Communities to Outer Space, with Safety and Peace of Mind

AirFree is a next-generation tire that does not need air-filling. We are working with members of various teams across organizational boundaries to establish technologies and explore business models with a view toward social implementation around 2026. AirFree technology is also leveraged in tires for lunar terrain vehicles. Expanding our mission from serving the local community to the extreme environment of outer space, Bridgestone will continue to take on challenges in order to be essential to the future of mobility.

Narumi Kawada
Global OE Strategy & New Mobility Business Development Department