



CIRCULAR SYSTEM ASPHALT



Asphalt, Japan – Circular System Characteristics

System characteristics:

Japan has one of the largest road networks in the world (1.22 million km; 791.189 miles). It has only 4% of the land area of the USA, but 50% of the road kilometer length of the USA. The infrastructure has industrial character: 80 out of 126 million people use the roads. (Almost) highest population density in the world: 347.07 inhabitants per km², 13th place in the world ranking (population density).

Availability/Role of recycling technology:

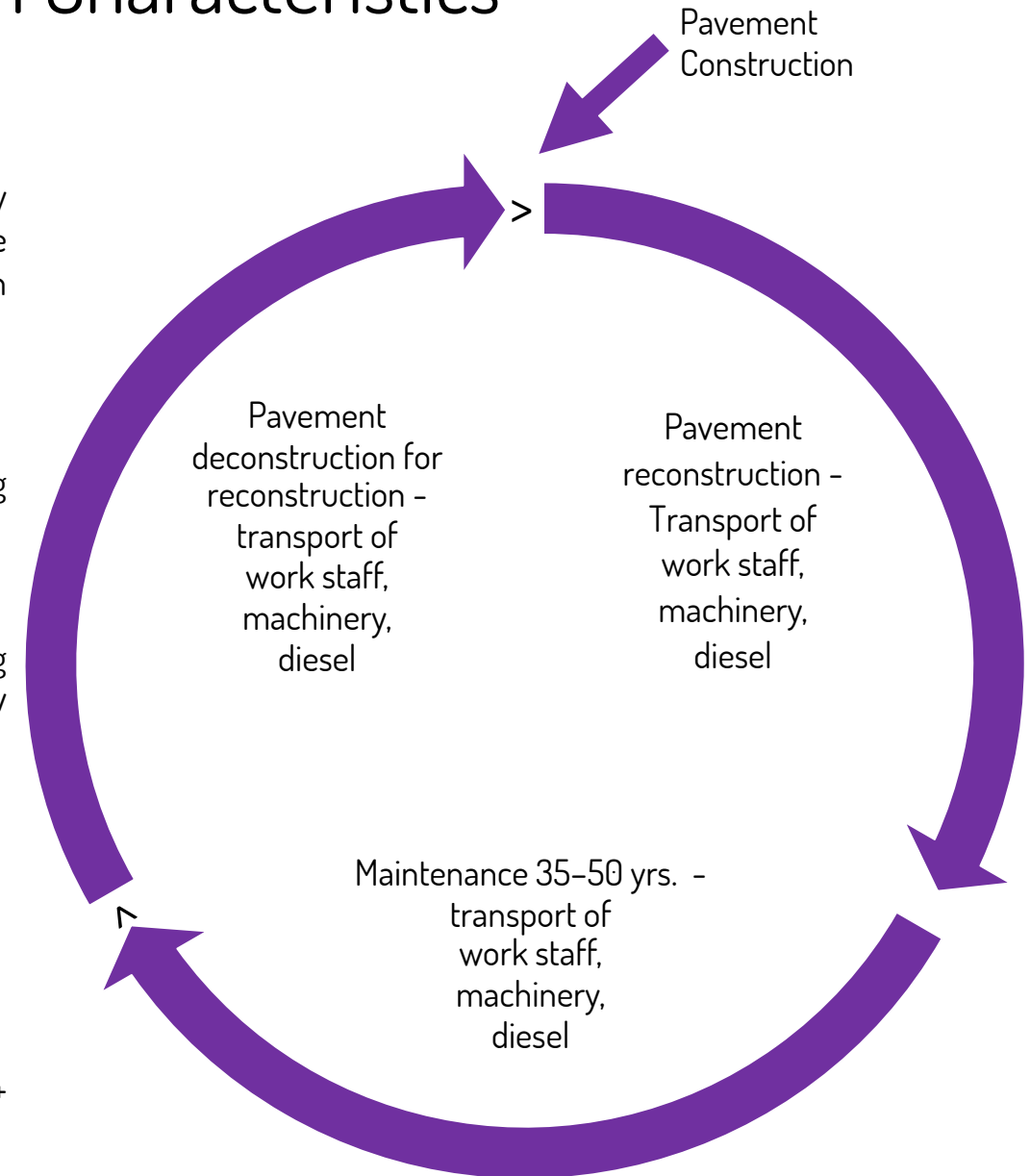
- Product durability is in the public interest (cost saving).
- Recycling process technology was developed by a scientific network, that has a clear job solving the problem as the country must cope with earthquakes and natural erosions.

Maturity of market:

- **Oligopolistic state managed system:** 47 prefectures, five regions and one national contracting authority. Each authority oversees an average of 22 road construction companies. Nine "raw material extraction" companies. 1,150 road construction companies.

Policy intervention type/regulations/directives:

- Public Cleansing Law No 137 of 1970; Basic Environmental Law 1993 & 2014 for Measures.
- "Procurement Eco Friendly Goods + Services by State and other institutions 2000".
- **Partition of Road Standards EN 15804.**
- **LCA ISO 14040 available.**
- Handbook of Plant Recycling of Pavement.
- Strong associations: Japan Asphalt Mixture Association JAMA, Public Institute for Land + Infrastructure Management, Public Works Research Institute, no Workers Union found.





SWOT Asphalt

1. Closed loop
2. Technical cycle, C2C
3. Compliance for Circular Economy
4. Coherent policies and strategies
5. Established scientific program/training
6. High satisfaction rates of users

Strength

1. Substitution of fossil bitumen not perfect
2. Stakeholder critics
3. Critical materials still exist
4. Indefinite circularity rate for bitumen, microplastics i.e.

Weakness

Opportunity

1. Image-Growth
2. Save money / cost effectiveness
3. Extended maintenance of infrastructure
4. First in the field sets standards

Threat

1. Earthquakes
2. Floods
3. Climate change erosions

A close-up photograph of a light-colored, porous rock resting on a dark, textured surface. A thick, black, viscous liquid, identified as crude oil, is dripping down the side of the rock. The background is dark and out of focus.

1. Nature Science

Crude oil as a useful source for many applications.



2. Envisioning

Building asphalt streets for better infrastructure and to prevent rubber tires from damage.



3. Investment

Investments in development of technology for oil production in 19th century.

4. Rocket Science

Invention of digitized close-the-loop technology to recycle streets just in place.



A satellite photograph of Japan and the surrounding Pacific Ocean. The Japanese archipelago is visible, with Honshu, Shikoku, and Kyushu clearly shown. The ocean is a deep blue, and white clouds are scattered across the scene. A semi-transparent grey box is overlaid on the image, containing text.

5. Historic Event

On 17th January 1995, one of the most severe earthquakes of Japan's history shattered the island. Japan realized its dependence from imports.



6. Cognition for System Relevance

Asphalt has become indispensable for infrastructure but highly threatened with earthquakes.



7. Technical Innovation

Market players have developed digitized close-the-loop technology to recycle streets just in place.



Japan Modified Asphalt Association

8. Business Innovation

The system has become manageable through a network of players.





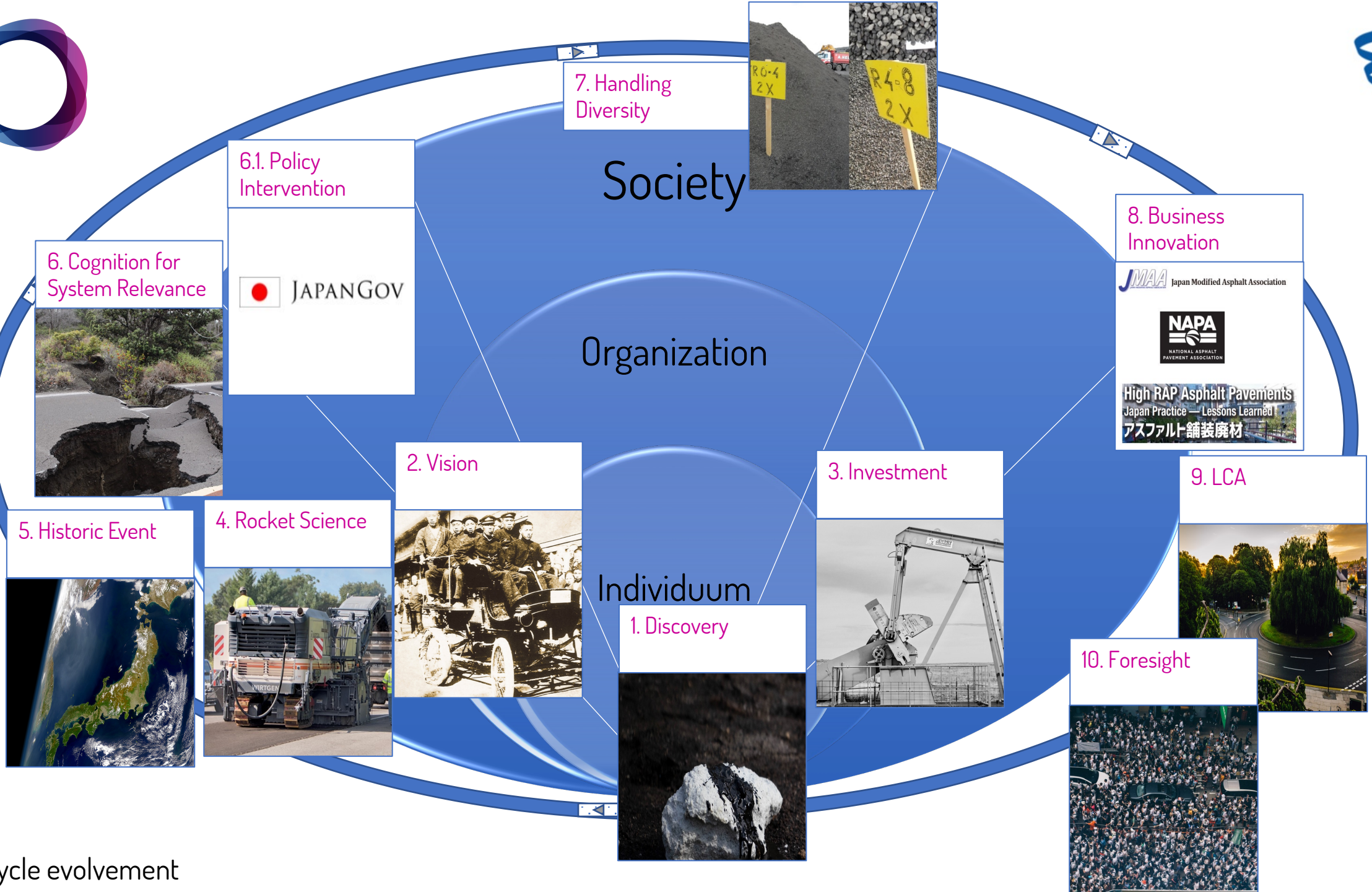
9. Life Cycle

System has evolved. Technical cycle is working. Asphalt recycling has reached circularity.



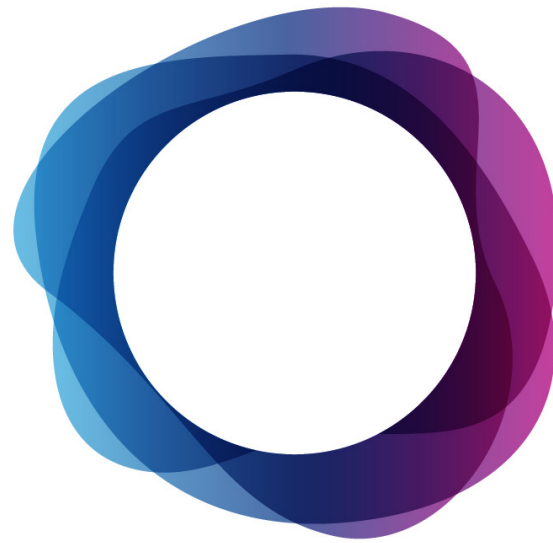
10. Forecast

Due to population and infrastructure growth and continuing threats through earthquakes, recycled asphalt demand is forecasted to rise.



Thank you
for your
attention

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