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Transforming Waste Management with SCW Technology

Subcritical Water Processing (SCW) technology is an advanced waste treatment system that operates at high temperatures and pressures just below the critical point of water. It uses hydrolysis to break down complex waste materials without harmful emissions.

- **Core Benefits**:

- Zero emissions from the reactor itself
- Versatile for a wide range of waste streams (municipal, medical, agricultural, industrial, sludge, and toxic substances)
- Significant waste volume reduction (up to 70%)

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Subcritical Water (SCW) -101

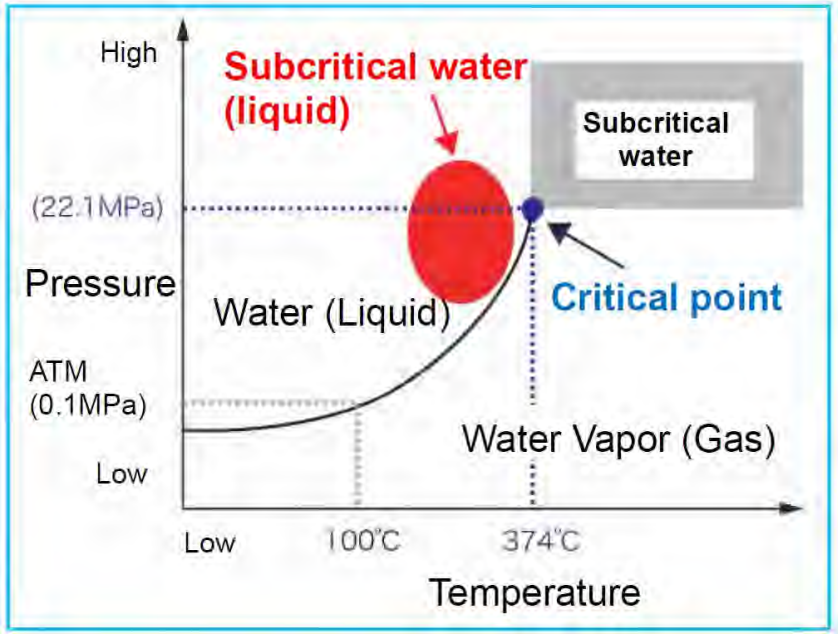
SCW technology works by heating water to very high temperatures (up to 374° C) and keeping it under extreme pressure (22.1 MPa) so it stays in liquid form.

At this temperature and pressure, water behaves in a way that allows it to break down all kinds of waste—whether it's municipal, medical, or even industrial materials like tires.

To put it in perspective, **22.1 MPa** is about 220 times the pressure we feel at sea level, and **374° C** is hot enough to melt most materials. Under these conditions, SCW systems can decompose waste safely and efficiently, without burning or creating harmful emissions.

Supercritical water, which happens above these thresholds, generates highly reactive substances called radicals, which can be dangerous.

The good news is that SCW works below these extreme conditions, so it avoids those risks while still being powerful enough to handle even tough waste like tires. In short, SCW offers a safe, effective, and eco-friendly way to transform waste without the dangers of traditional incineration.

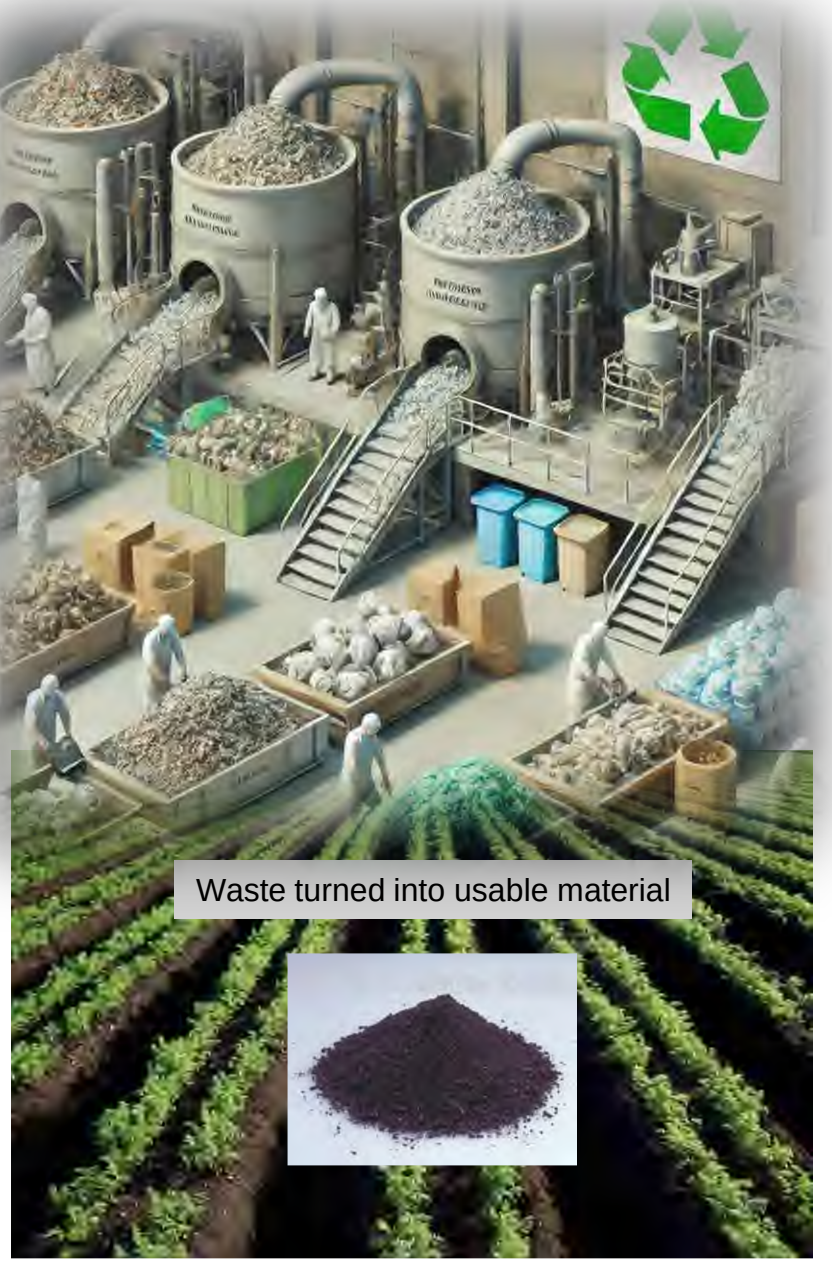


Effective Use

Converting medical waste and organic waste, including paper diapers, into valuable materials

The materials that can be made from completely sterilized materials are sold as raw materials or used in a variety of products, increasing profitability while also making a significant contribution to the creation of a resource-circulating society.

Examples of commercialized products
- Organic fertilizer/liquid fertilizer
- Biomass fuel
- Plastic raw materials
- Methane gas fermentation materials
- Bioethanol material
- Building materials



Key Benefits of SCW Systems

- **Zero Emissions**:
SCW systems produce no harmful emissions such as dioxins. Minor emissions from boiler exhaust and minimal wastewater can be easily managed.
- **Wide Application Range**:
SCW systems can handle a variety of waste types, including hazardous chemicals like PFAS (forever chemicals), medical waste, and sludge. They are ideal for municipal waste reduction and industrial applications.
- **Waste Reduction**:
SCW systems reduce waste volumes by over 70%, providing significant landfill reduction potential.
- **Scalability**:
SCW systems can be scaled to both large urban waste facilities and smaller regional operations, making them highly adaptable to New Zealand’s waste management needs.

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Key Benefits and Environmental Impact of SCW Technology

Category	Description
Emissions	Zero harmful emissions when boiler exhaust is directed into a condenser tank and RO system. No release of dioxins or other toxic gases.
Waste Volume Reduction	Up to 70% reduction in waste volume, greatly reducing landfill needs.
Handling of Heavy Metals	SCW stabilizes heavy metals like copper and mercury, but does not destroy them. May require further treatment for complete handling.
Forever Chemicals (PFAS)	SCW can partially break down forever chemicals (PFAS/PFOS), weakening their structure. Further processing may be required for full destruction. PFOS:Perfluorooctanesulfonate
Dioxins and Toxic Substances	SCW produces no dioxins due to the absence of combustion. Toxic substances such as PCBs are broken down into non-toxic byproducts. (PCB: Polychlorinated Biphenyls)
Energy Efficiency (Calorific Value)	High net calorific values, such as 24,010 kJ/kg for some waste streams, indicating energy-efficient processing. - almost equivalent to the energy found in 1 kg of coal
Waste Types Processed	Effectively handles municipal, medical, industrial, agricultural, and hazardous waste (e.g., pesticides, pharmaceuticals, and chemical solvents).
Water Recycling	RO system enables water recycling and captures waste products for further treatment, reducing environmental impact.- RO: Reverse Osmosis

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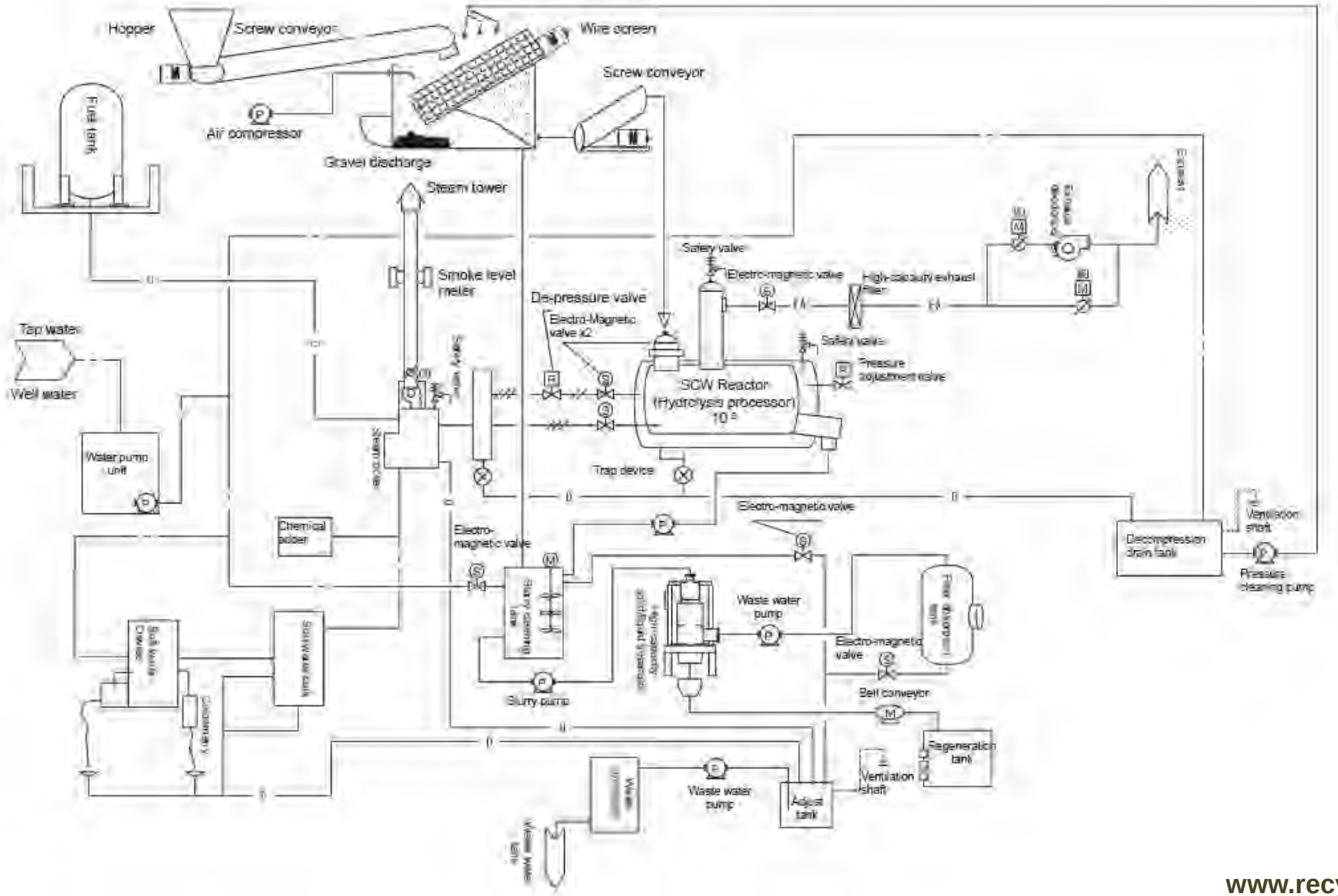
Sub-Critical Water System Flow Diagram



SCW Plants in Japan

- **ECO Mirai in Charicho**:
Handles mixed municipal waste with high efficiency, showcasing the flexibility of SCW technology in large-scale applications.
- **Kiyou in Hiroshima**:
Focused on handling hazardous medical waste, converting it into non-toxic byproducts. This demonstrates the technology's applicability in specialized waste streams like healthcare.
- **Manufacturing Expertise**:
Both plants were designed and manufactured by Subcritical Material Company Limited, in collaboration with OEM companies, ensuring top-quality implementation and technology.

SCW Systems Across Asia

- Korea’s interest, other Asian countries, success in meeting regulations.
- **Korea**:
SCW systems are gaining traction in Korea due to stringent zero-incineration policies and limited landfill space, providing a cleaner, scalable alternative for waste management.
- **Other Regions**:
Interest is growing from countries like Australia, where sustainability goals align well with SCW's zero-emissions and waste reduction capabilities.
- **Proven Track Record**:
SCW technology has a successful track record across Asia, handling complex waste streams efficiently while meeting regional environmental regulations.

Customer Support and After-Service

- **Comprehensive Pre-Purchase Consultation**
We work closely with customers to understand their specific waste streams and customize SCW systems to meet their operational needs.

- **Installation and Ongoing Maintenance**:
Full support is provided throughout the installation process, with minimal maintenance required. Scheduled reactor checks ensure long-term efficiency.
- **Upgrades and Scalability**:
SCW systems can be easily scaled or upgraded based on the changing needs of the facility, ensuring ongoing adaptability and performance.

Custom Solutions for Your Needs

- Portable and permanent options, adaptable for various waste streams.

- **Tailored Systems**:
SCW systems are available in both portable and permanent configurations. Portable units, currently used by military units for disaster response, are particularly suited for addressing legacy landfills or regional waste management challenges.
- **Adaptable for Various Industries**:
SCW systems can handle waste streams from medical, agricultural, and industrial sectors. Future developments also include handling industrial waste such as tires.

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Why Choose Us?

- Experienced team, proven track record, full lifecycle support.

- **Experience and Expertise**:
With over 30 years of experience in bringing solutions from Japan, we bring a deep understanding of both the technology and bringing the market to you.
- **Proven Success**:
Our partnership with Subcritical Material Company Limited and other leading Japanese manufacturers ensures that customers receive cutting-edge solutions backed by proven success stories.
- **Long-Term Support**:
We provide full lifecycle support, from system design and implementation to post-installation maintenance and future upgrades. Your investment in SCW technology is secure with our ongoing assistance.

Next Steps

- Consultation, customization, securing your system, financing options.
- **Get in Touch**:
Contact us to discuss your specific waste management needs and how SCW systems can meet them.
- **Customization Options**:
We'll work with you to customize the system based on your waste streams, volume, and operational goals.
- **Secure Your System**:
Plan ahead, as SCW systems have a lead time of approximately 18 months for delivery and installation.
- **Explore Financing and Partnership Opportunities**:
We can help facilitate financing options and explore partnership opportunities to maximize the value of your SCW system investment.

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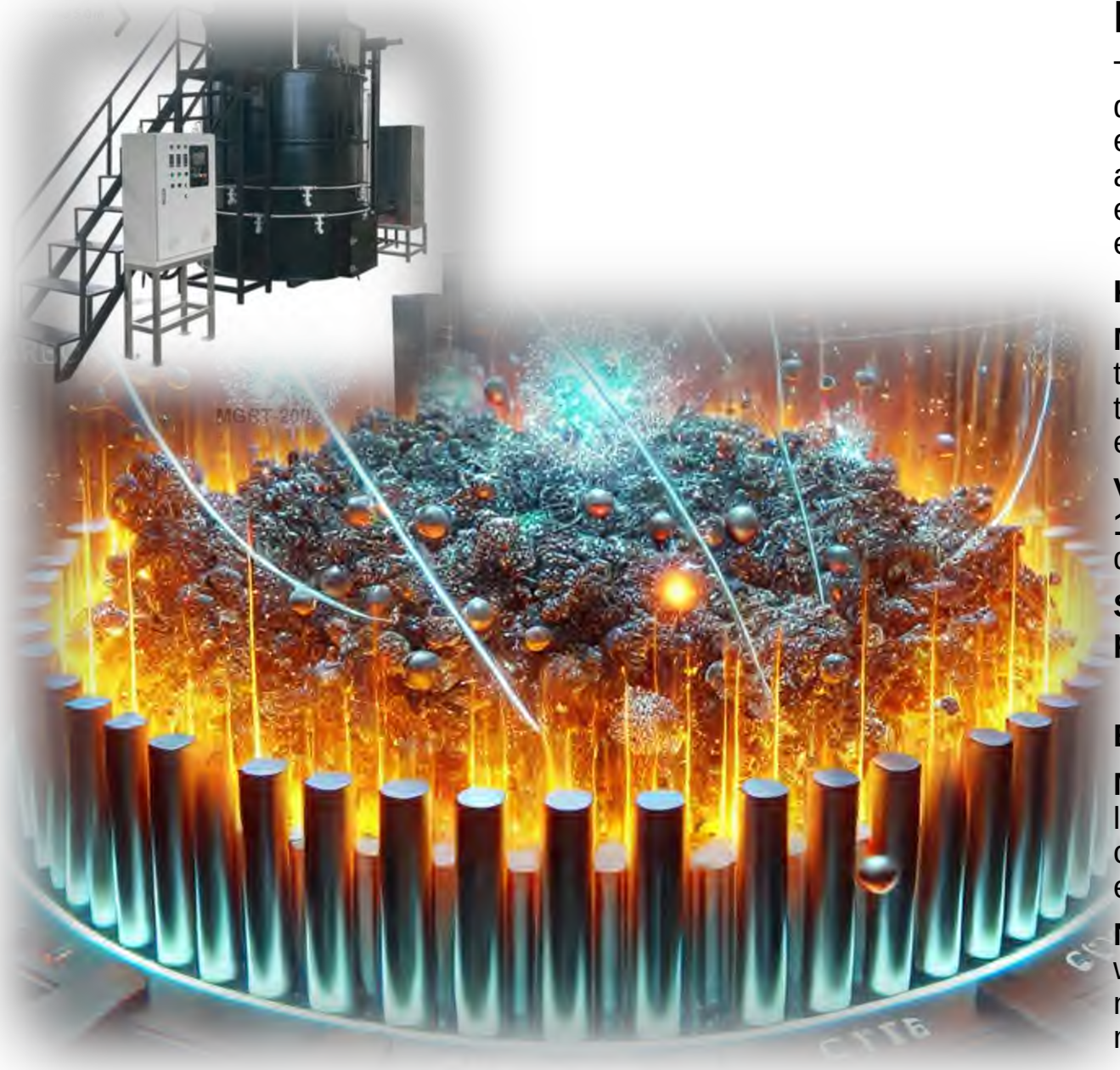

Additional Technology – Magnetic Powered Decomposition

The **Nissho Engineering MG-22** is a state-of-the-art thermal decomposition unit designed to significantly reduce waste volume and emissions through innovative magnetic heating technology. Its advanced waste processing capability allows for a cleaner, more efficient solution to industrial and organic waste, offering both environmental and cost-saving benefits.

Key Features

Magnetic Heat Decomposition: The MG-22 employs a magnetic field to generate heat, enabling the decomposition of organic waste without the need for open flames, reducing the risk of fire hazards and cutting emissions.

Volume Reduction: Capable of reducing waste volume by **1/300 to 1/400**, this unit minimizes the space required for waste storage and disposal, making it highly efficient for industrial applications.

Secondary Reuse: After waste is processed, the resulting **MG powder (ash)** can be safely disposed of into cement or land.

Environmental Impact

Minimized Greenhouse Gas Emissions: By decomposing waste at lower temperatures compared to incineration, the MG-22 drastically cuts down on **CO_2 and dioxin** emissions, adhering to stringent environmental regulations.

No Wastewater Generation: Although steam is produced for hot water or electrical generation. The closed system design ensures that no wastewater is produced, while minimal exhaust gases consist mainly of **trace amounts of carbon monoxide and hydrocarbon oil**.

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Operational Efficiency
Cost Reduction: The MG-22 reduces overall waste processing costs by handling waste on-site, eliminating the need for extensive transport and external processing.

Customizable to Site Needs: The unit is adaptable to various installation environments, with configurations for both indoor and outdoor use, depending on the space and regulatory requirements.

Energy Efficiency and Reuse
The MG-22 not only processes waste efficiently but also allows the **secondary use of steam energy** generated during exhaust gas treatment, further reducing energy consumption and costs (additional equipment required).

Safety and Compliance
Fully compliant with Japan's **Waste Disposal Law Enforcement**

Regulations, the MG-22 meets all required standards for thermal decomposition devices. This ensures that businesses can safely operate within legal parameters without risk of reclassification as an incinerator.

Applications
Ideal for companies with **monthly processing costs exceeding $800.00 NZ** and those aiming to **reduce greenhouse gas emissions** as part of their sustainability goals.

Suitable for industries handling various types of waste, such as manufacturing, agriculture, medical and municipalities, particularly those focused on **resource reuse and waste management efficiency**.

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Pyrolysis for Tires and Plastics

Processing and Oil Production

Pyrolysis is a thermal decomposition process that converts tires and plastic waste into valuable by-products like **oil**, **carbon black**, and **gases**. The pyrolysis technology (HiCOP system) is designed for maximum efficiency and environmental safety.

The produced oil, refined to **less than 70 ppm of Sulphur**, is highly valuable and suitable for multiple industrial applications such as fuel for vehicles (after further refining), industrial furnaces, and power generation.

The system works by heating the feedstock (tires, plastics) in the absence of oxygen, breaking down long hydrocarbon chains into shorter ones. The oil produced is a mix of **naphtha** (gasoline range) and **diesel fractions**.

This oil can be further refined for use in various energy-intensive industries or even as raw materials for producing new plastics.

Key Benefits

Low Sulphur Content Oil

The oil produced contains **less than 70 ppm Sulphur**, making it compliant with stringent fuel quality standards. This low Sulphur content reduces air pollution when used as fuel, aligning with global environmental goals

Environmental and Industrial Applications

Automotive and Industrial Fuels: The oil produced is suitable for use in vehicles (after further refining), heavy machinery, and industrial boilers. Additionally, it can be refined into chemicals for plastic production.

Sustainability: By converting waste plastics and tires into usable energy sources and valuable by-products, pyrolysis reduces landfill waste and promotes a circular economy.

Compliance with Regulations: The low Sulphur and chlorine content in the produced oil ensures compliance with strict international standards for emissions and fuel quality

Conclusion

Pyrolysis technology, especially as developed in Japan, offers a sustainable and efficient solution to the global problem of plastic and tire waste. Its ability to produce high-quality, low-Sulphur oil, safely remove heavy metals and forever chemicals, and minimize waste volume makes it a promising technology for a cleaner future.