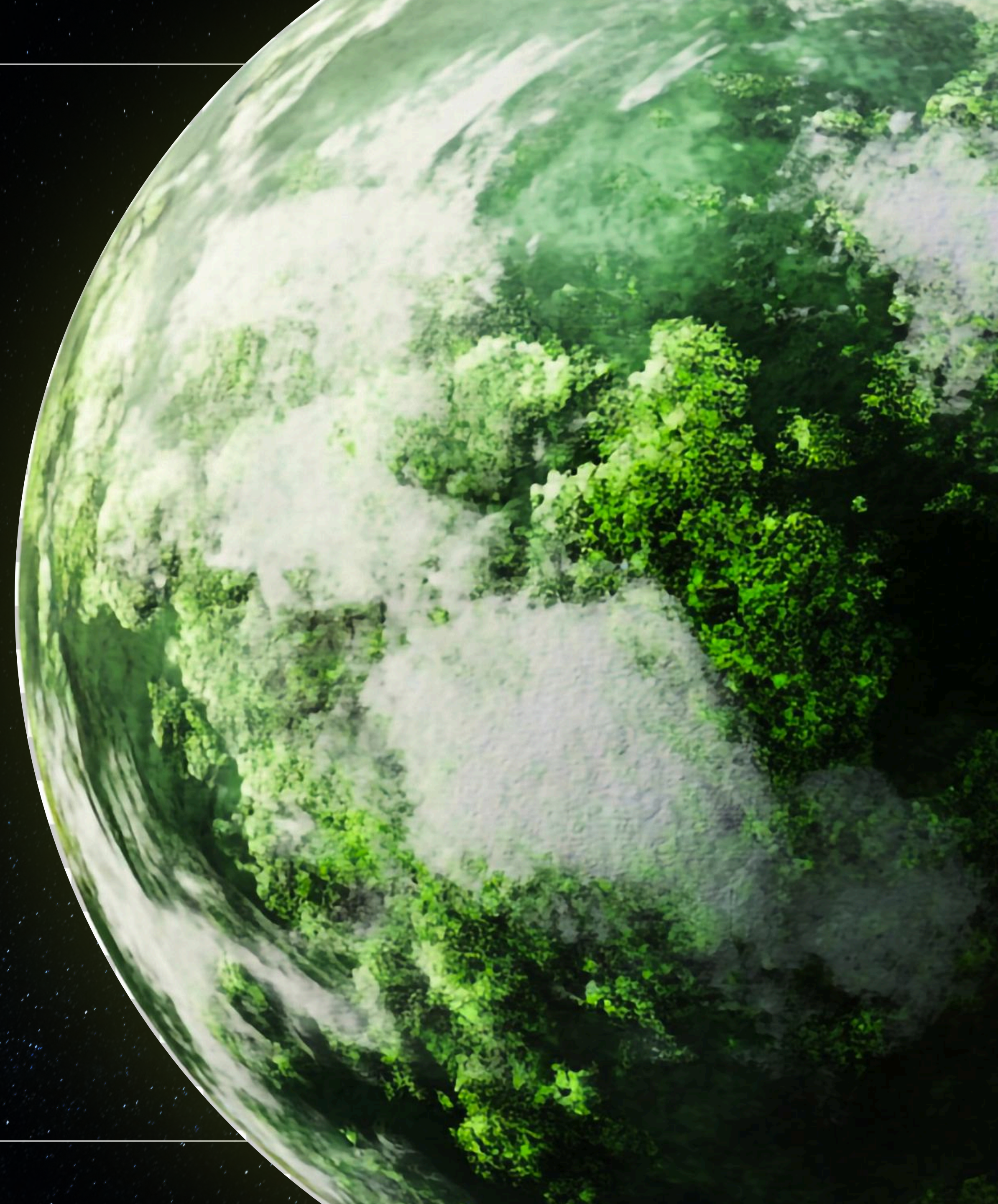


RECYCLING **SECONDARY RAW** **MATERIALS**

DIRECTION: Energy Sector

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WASTE POLLUTION AND RECYCLING CHALLENGES

Various technologies are being developed to process solid municipal waste (SMW) and other secondary raw materials, including waste-to-energy conversion. Chemical recycling is an umbrella term that encompasses raw material processing, depolymerization, and purification

Every day, thousands of tons of waste pollute our planet. In some countries, household waste reaches between 0.6 and 1.0 tons per person annually. Consequently, waste recycling has become one of the most crucial tasks in the environmental, public health, and socio-economic sectors of industrialized nations

Traditionally, waste incineration—commonly referred to as “waste-to-energy plants”—was used for energy recovery. Today, modern waste processing technologies enable energy production in an environmentally friendly manner

WASTE AS A RENEWABLE ENERGY RESOURCE



Energy from waste not only supplies cities and industries with heat, electricity, steam, and hot water, but also addresses critical environmental issues:

- » disposing of non-recyclable waste
- » reducing fossil fuel consumption
- » minimizing landfill use

The concept of “waste” now includes materials with the potential to be used as renewable energy sources, such as:

Industrial waste

Production by-products

Agricultural waste

Solid municipal waste

According to the International Energy Agency, energy recovery is the best alternative to landfilling and an integral part of waste management



WASTE INCINERATION FOR ENERGY PRODUCTION

In the USA,

28% of all waste was incinerated
for energy production in 2018

Recycling and converting waste into energy involve several methods—primarily thermal destruction, including incineration, pyrolysis, and gasification—which process solid, liquid, and semi-solid waste

Combustion occurs when waste reaches its ignition temperature in the presence of oxygen, triggering oxidation and releasing thermal energy

**This process enables the generation
of various energy forms**

UTILIZING EXCESS HEAT FOR ELECTRICITY AND HEATING

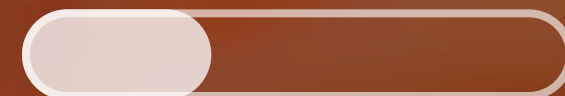
Excess heat from waste incineration is used to generate steam for:

- » Electricity production
- » Heating nearby processing facilities
- » Centralized heating or cooling

Thermal energy systems can achieve up to **90%** efficiency,



while electricity generation is around **30%**



Various technologies, including layered furnaces, are used to incinerate waste for thermal and electrical energy. These methods are suitable for processing combustible materials such as industrial, construction, bulky, hazardous waste, wood, paints, mixed municipal waste, and used oils



During incineration, superheated steam is produced and then used for power generation, heating, or as process steam

ROTARY DRUM INCINERATORS & PYROLYSIS

ROTARY DRUM INCINERATORS

These units are used to burn municipal, medical, biological, and industrial (solid and semi-solid) waste, oil sludge, and dewatered sewage sludge. The process temperature is maintained between 900–1200 °C. The produced heat is used for onsite heating and hot water supply for both operational and production purposes

PYROLYSIS

Solid municipal waste (SMW), disinfected medical waste, rubber products, tires, used oils, and plastic waste undergo dry pyrolysis. This method involves thermal decomposition at high temperatures with limited or no oxygen, yielding:



- Pyrolysis gas
- Solid carbonaceous residue
- Organic liquid products

PROCESS OF PRODUCING PYROLYSIS GAS FROM WASTE

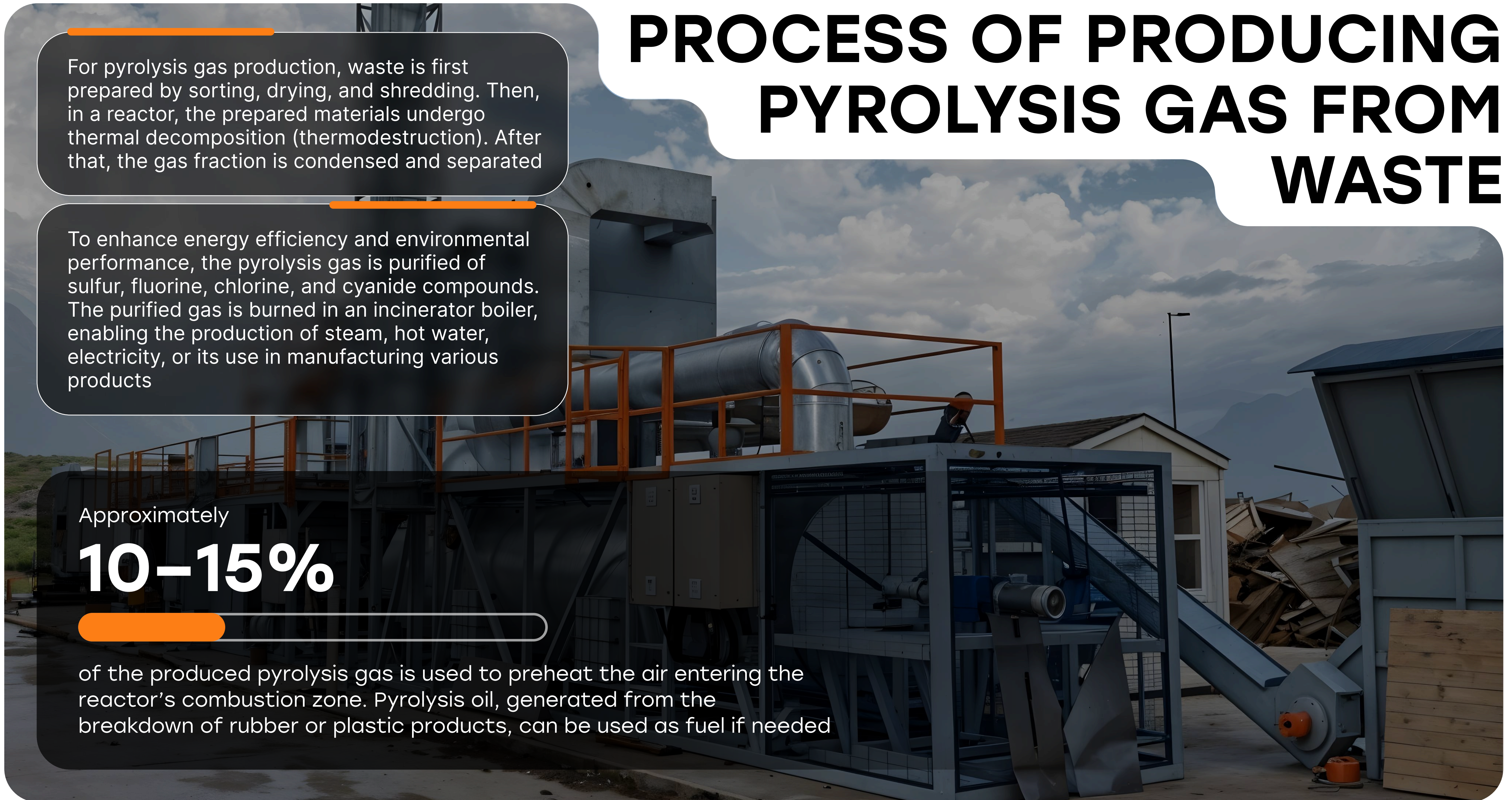
For pyrolysis gas production, waste is first prepared by sorting, drying, and shredding. Then, in a reactor, the prepared materials undergo thermal decomposition (thermodestruction). After that, the gas fraction is condensed and separated

To enhance energy efficiency and environmental performance, the pyrolysis gas is purified of sulfur, fluorine, chlorine, and cyanide compounds. The purified gas is burned in an incinerator boiler, enabling the production of steam, hot water, electricity, or its use in manufacturing various products

Approximately

10–15%

of the produced pyrolysis gas is used to preheat the air entering the reactor's combustion zone. Pyrolysis oil, generated from the breakdown of rubber or plastic products, can be used as fuel if needed





WASTE GASIFICATION

- The gasification method involves thermally processing organic waste using an oxidizer to produce synthesis gas and a mineral byproduct (in solid or molten form)
- The primary technology for producing synthetic gas used by Del Mar Energy Inc. is a method based on the application of electric arc generators (plasma energy sources) in high-temperature processing installations for organic waste, including municipal solid waste (MSW), industrial, and medical waste
- The system's operating temperature exceeds 5500 °C, ensuring nearly complete conversion of waste into synthetic gas. The byproduct is a clean, high-calorie gas used for producing chemicals, liquid fuels, and generating energy

PLASMA GASIFICATION PROCESS:

- Thermal treatment of organic waste
- Generation of synthetic gas
- Application of the gas in industry and energy sectors

CHALLENGES IN WASTE-TO-ENERGY TECHNOLOGIES

▶ In the quest to modernize waste management systems, local authorities often face the question: Is it worth investing in waste-to-energy (WTE) technologies? These technologies are increasingly seen as an attractive solution not only to waste disposal challenges but also to pressing issues like energy shortages, limited landfill space, and reducing greenhouse gas emissions caused by improper waste handling

▶ However, implementing WTE technologies is often hindered by obstacles such as the absence of tariff systems for financing investments and operational expenses, insufficient enforcement of environmental regulations, and a shortage of qualified personnel to effectively manage these systems

▶ Ignoring these risks could lead to the failure of WTE projects, causing harm to both the city and the surrounding environment.

RAPID GROWTH OF MUNICIPAL SOLID WASTE

The rapid increase in municipal solid waste (MSW) in fast-growing cities of transitional and developing countries is raising serious concerns about its impact on public health and the environment. Today, waste generated by nearly 3 billion people is being disposed of in an uncontrolled manner

As awareness of environmental pollution and its effects on quality of life grows among citizens and officials, effective municipal solid waste management is becoming a critical priority at both local and global levels

THE ROLE OF RECYCLING IN ENVIRONMENTAL PRESERVATION

The recycling business for secondary raw materials plays a crucial role in protecting the environment, thanks to its eco-friendly features

Its main advantage is pollution reduction: recycling minimizes the waste sent to landfills, thereby reducing contamination of soil, water, and air, as well as lowering greenhouse gas emissions from waste decomposition

This is vital for curbing global warming and enhancing quality of life. Additionally, recycling conserves natural resources by reducing the demand for primary raw materials like timber, ore, and oil

For example, recycling paper cuts down on deforestation, metal recycling reduces ore extraction, and plastic recycling decreases the need for new polymers

Recycling processes typically require less water and energy compared to producing materials from virgin resources, making them more energy-efficient and cost-effective

Moreover, recycling fosters a sustainable economy through a closed-loop resource system and promotes the development of green technologies. Thus, recycling not only mitigates environmental damage but also helps build an eco-conscious society



MODERN WASTE RECYCLING TECHNOLOGIES

Modern waste recycling technologies aim to make the process as eco-friendly and safe as possible

One key focus is on implementing automated sorting systems that use optical scanners, magnetic and eddy current separators, and artificial intelligence for precise separation of materials like



This improves the quality of secondary raw materials and minimizes the volume of non-recyclable waste

For plastic recycling, both mechanical and chemical methods are employed: mechanical recycling involves shredding, melting, and granulation, while chemical recycling (pyrolysis, hydrolysis, gasification) breaks down complex polymers into monomers and other compounds suitable for producing new materials

ADVANCED RECYCLING TECHNOLOGIES

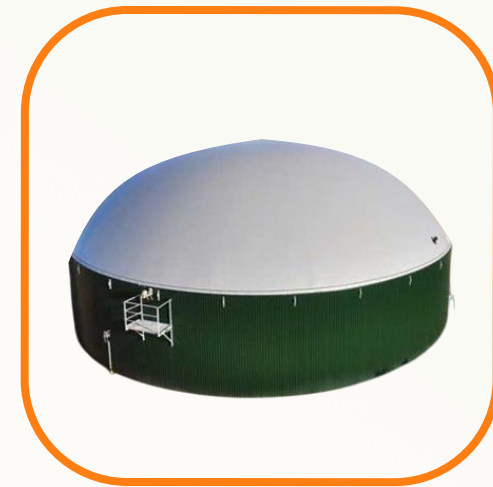
- ▶ Organic waste is processed using aerobic composting, which converts organics into fertilizers, and anaerobic digestion, which produces biogas for energy generation
- ▶ For thermal processing of waste like rubber or textiles, pyrolysis and plasma gasification are employed to break down materials with minimal harmful emissions
- ▶ Modern waste-to-energy plants are equipped with emission control systems that significantly reduce air pollution

- ▶ Recycling of glass and metals utilizes low-energy melting technologies, enabling nearly endless recycling without loss of quality
- ▶ Additionally, cryogenic technologies are used to break down multilayer materials, such as printed circuit boards, for efficient metal recovery
- ▶ Electronic waste recycling includes chemical leaching to extract rare earth metals and automated robotic disassembly lines



RENEWABLE ENERGY & DIGITAL INNOVATIONS IN RECYCLING

To boost the eco-friendliness of recycling, many companies are switching to renewable energy sources—such as solar panels, wind turbines, and biogas plants—making their operations nearly carbon-neutral



Digitalization and blockchain technology also play a crucial role by providing transparency and control at every stage of waste processing, from collection to the production of secondary raw materials

These innovations reduce greenhouse gas emissions, minimize energy use, and foster a sustainable economy while lessening human impact on nature



ENHANCING PROFIT MARGINS IN WASTE RECYCLING

Improving the profitability of waste recycling requires a comprehensive approach that includes modern technologies, process optimization, and effective resource management

Automated sorting lines using optical scanners, magnetic separators, and AI reduce labor costs, increase processing accuracy, and boost recycled material volumes. Expanding recyclable materials—such as electronic scrap and composites—opens new markets for high-margin products

Transitioning to renewable energy and employing advanced techniques like low-temperature melting and pyrolysis further reduce costs and environmental impact

BUILDING A CIRCULAR ECONOMY & SUSTAINABLE PARTNERSHIPS

Creating a closed-loop system where recycled materials are repeatedly reused is essential. Collaborations with secondary raw material suppliers and the implementation of reverse recycling systems strengthen long-term partnerships and business resilience

Optimizing logistics through geoinformation systems significantly reduces transportation costs. Additional savings are achieved through government subsidies, grants, and tax incentives, as well as partnerships with environmental organizations and corporations committed to sustainability



Educational and marketing campaigns promote recycling awareness, boost waste collection, and foster customer loyalty, setting the stage for a greener, more competitive future

An industrial facility, possibly a power plant or refinery, is shown at sunset. Two tall smokestacks are visible, with the one on the left emitting a thick plume of orange and white smoke. The sky is a mix of blue and orange. In the foreground, there are several large, light-colored storage containers or tanks. The overall scene is industrial and somewhat somber due to the smoke.

THE FUTURE OF WASTE RECYCLING ON GLOBAL MARKETS

The future of the waste recycling business on global markets looks promising, given the growing environmental challenges, legislative initiatives, and changing consumer preferences. This sector is becoming not only a key element of sustainable development but also an attractive area for investments

STRENGTHENING ENVIRONMENTAL REGULATION:

Global markets are increasingly adopting strict environmental standards. Governments are enacting laws to reduce waste volumes, enforce mandatory waste sorting, and boost recycling rates

For instance, EU countries are actively implementing circular economy principles, aiming to recycle 60–70% of waste. Similar measures in the USA, China, and other nations are driving demand for innovative recycling solutions

INNOVATIONS AND TECHNOLOGICAL ADVANCEMENTS:

ROBOTICS AND AI

- ▶ Automating sorting lines and using AI to optimize recycling processes

BIOCHEMICAL TECHNOLOGIES

- ▶ New methods for processing organic and complex waste with minimal environmental impact

DIGITALIZATION

- ▶ Implementing blockchain and analytical platforms to monitor the recycling chain and enhance transparency



GROWING AWARENESS AND SHIFTING CONSUMER PREFERENCES

Modern consumers are increasingly aware of the importance of waste recycling and sustainable consumption. This awareness motivates businesses to invest in green technologies and recycling processes to meet customer expectations and build loyalty. Companies that showcase their environmental initiatives gain a competitive edge globally

INTEGRATION OF A CIRCULAR ECONOMY

The global economy is shifting toward a circular model, where waste is viewed as a resource. Recycling becomes crucial in producing secondary raw materials for new products, reducing waste volumes, and lowering the pressure on natural resource extraction



DEVELOPMENT IN EMERGING MARKETS:

In developing countries like India, Brazil, and various African nations, waste recycling is still in its early stages. However, these markets are poised for rapid growth, supported by international organizations, infrastructure investments, and new technologies. These regions offer enormous potential for industry expansion

INVESTMENT EXAMPLE

By opening a deposit with the
minimum allowed amount of

\$150,000

after

240 DAYS

your balance will be

\$549,360



Deposit Term: 240 days

ROI: 366.24%



DEL MAR ENERGY INC.

is an american holding company primarily focused on the extraction, processing, and sale of oil

The company also engages in electricity production and distribution; manufacturing, repairing, and leasing electromechanical equipment; designing and constructing wind, solar, and geothermal power plants; extracting coal and gas; and developing oil and gas infrastructure

Having started out with just a few oil rigs in 2002, we began developing and manufacturing with our own technologies in 2012

today

91%



of our products are exported to more than 40 countries worldwide

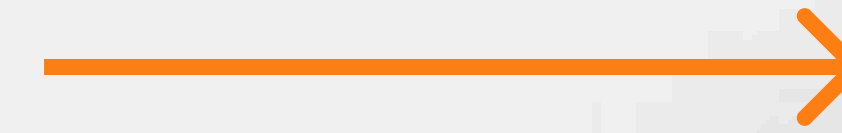
TEAM

MICHAEL LATHAM



Founder/CEO

Michael Latham is the founder and CEO of Del Mar Energy. He established the holding company in 2002 in Texas, successfully building and growing industrial sectors



NICK KAUFMAN



COO (Chief Operating Officer)

Nick has served as COO since 2018. A Texas native and graduate of the University of Massachusetts, Nick initially worked in law. He first encountered Del Mar Energy in 2013 and officially became a partner in 2018. Nick introduced many of the modernized technologies now used in production

STEFAN RUSSO



CIO (Chief Information Officer)

Stefan started his internship at Del Mar Energy in 2016. In less than five years, he advanced from intern to company director

THOMAS LIEBERMAN



CMO (Chief Marketing Officer)

Born in 1984 in Nevada, Thomas studied at a local university before moving to New York in 2006 to work in marketing and public relations. He began collaborating with Del Mar Energy in 2011. Prior to joining the company, Thomas worked on promoting brands such as P&G, Gillette, and General Motors

LEADERSHIP