Waste Tires Recycling Energy Plant

I.H.Q Co., Ltd.

Challenge the Future

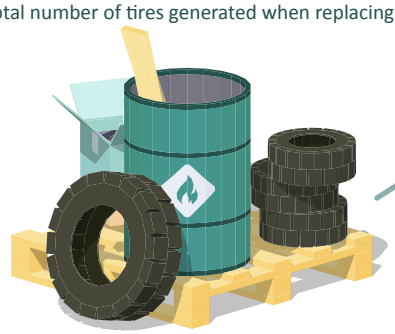
We are a Japan-based company specializing in the Sustainable Development Goals (SDGs), providing intellectual property, project support consulting, and management and operations services.
In this brochure, we will introduce our “Type A Heavy oil*” refining business derived from renewable energy sources, and our plants that lead to the implementation of carbon neutrality.

*Categorization made by the JIS,
Type A heavy oil is heavy oil that contains 90% light oil component.

Problems of Waste Tires

The amount of waste tires generated annually

*Total number of tires generated when replacing tires and when scrapping vehicles



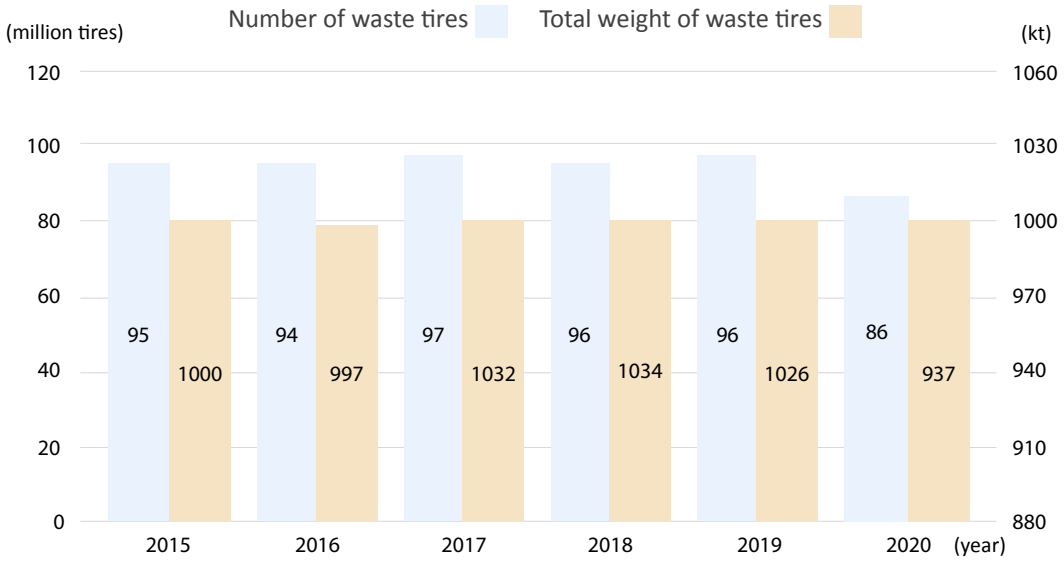
about **94** million tires

*The average in the last 5 years

It is estimated that about 100 million tires are created in Japan each year, and about 1 billion tires (about 17 million tons) are created worldwide.

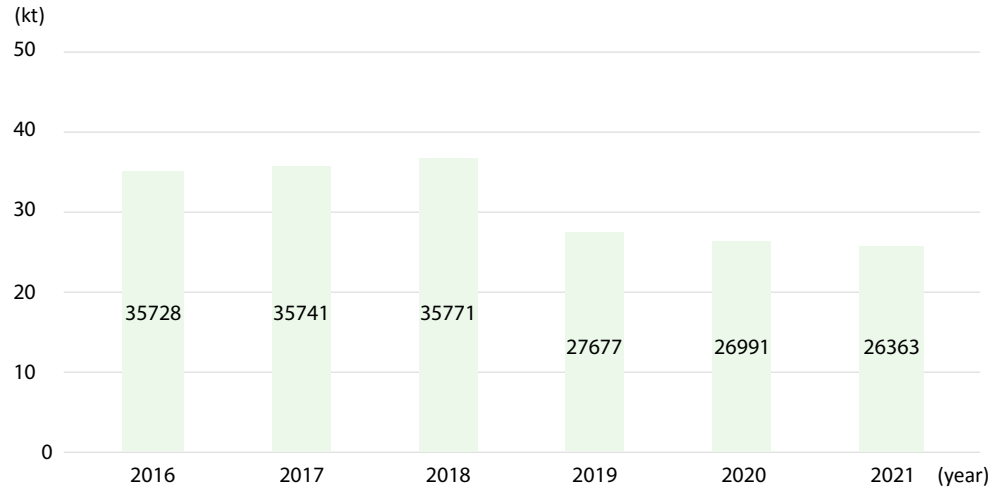
In recent years, the problems surrounding waste tires have become more serious year by year, such as the increasing environmental burden caused by improper disposal methods, the shortage of remaining capacity in domestic final disposal facilities, and illegal dumping that leads to environmental pollution.

Number of waste tires and their total weight that are generated in Japan



The sittuation of waste tires

The amount of Illegally dumped waste tires in Japan



Survey results at the end of February 2021

Pros

The Benefits of the Project

Point 1

Creation of a sustainable society

The business of cutting and refining tires into recycled fuel can play a role in creating a sustainable society by reducing the degree of dependence on fossil fuels, as well as greenhouse gas emission.

The plant can be installed on a small scale, allowing for flexible implementation of environmentally friendly initiatives.

Point 2

High investment efficiency

Investment efficiency is extremely high, and the most important factor, such as procurement of raw materials, can be secured only from domestically produced scrap tires.

Point 3

Contributing to the SDGs

Various companies and organizations around the world have taken on the challenge of becoming carbon neutral in recent years. With this project, people are able to contribute to the creation of a decarbonized society together with the rest of the world through technology that converts to fuels derived from renewable energy sources.

We are proud to announce that we gave presented at the 2020 Dubai World Expo.

Awarding ceremony of appreciation certificate

The Process of Recycled Fuel Production

Process 1 Waste tire oil treatment

Process 2 Fuel refining process

Process 3 Electrification

Waste tires (pre-cut)

Oiling Equipment Carbonization Furnace

500℃

Waste tires (2 tons) are placed in a cartridge and set in the furnace.
Gasification is performed by an oxygen-free heat treatment at about 500°C.

Steel (10vol%)

Carbon Black (40vol%)

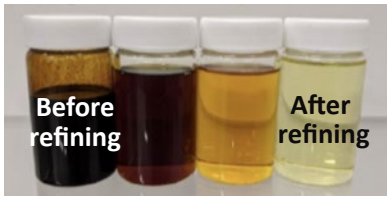
Gasification Oil Content (40%)

50℃

Cooling Tower

The gas is cooled and turned into a liquid.

Waste Tire Crude Oil



Separation Tank

The water is separated from the liquid fuel.

Mixing Tank

The proprietary catalyst is mixed with the separated fuel.

Refining Equipment

Separates heavy oil from impurities.

Type A Heavy Oil

Completion of fuel derived from renewable energy sources.

Checking Tank

Fuel coming out of the refiner is checked and transferred to the production tank.

Diesel Powerplant

Can generate electricity 24 hours a day with heavy oil (approx. 120L)

Electricity Self-supply or Electricity Sales

To run a 100kVA generator 24 hours a day, about 120L of Type A heavy oil is required.
↓
Power generation per hour is 1000kw x 24 hours = 24,000kw

Off-gas
(10% / of which 0.02% is a residue)

- Heat Treatment — 500℃
- Off-gas Processor — 100℃ — Apply secondary combustion.
- Exhaust Stack — 1300℃

Exhaust

Point 1 Carbon Black

The global carbon black market is expected to reach approximately $8.7 billion by 2028, up from approximately $4 billion in 2021. The carbon black market is still in its early stages and there are many business opportunities due to the need for environmentally friendly alternatives to reduce carbon dioxide emissions.
Aggressive investment by major manufacturers is also expected to fuel the growth of recovered carbon black.

Point 2 Proprietary Catalyst

Proprietary catalysts Although many other companies has tried before, it has been difficult to remove impurities completely. We have succeeded in refining the fuel with absolutely no impact on the environment by creating a proprietary catalyst that completely processes the impurities and separates the residues.

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Point 3 Pollution-Free

Off-gases and residues are also treated in an off-gas processor to make them pollution-free. The only emissions are the heat (non-polluting) from the burner generated under the oil conversion equipment.

Exhaust tower　　Burner of Oiling equipment

Oiling system carbonization furnace per furnace

Capacity of waste tires：2t Required time (to complete fuel oil production)
complete fuel oil production)：approx. 4 hours
Maximum fuel quantity (heavy oil)：800ℓ

Property Analysis for Each Oil

Data	Testing Methodology	Extracted oil from waste tire Sample 1	Extracted oil from waste tire Sample 2
Flash Point (℃)	JIS K 2265-3	71.5	71.5
Distillation Properties, 90% distillation temperature(℃)	JIS K 2254	330.0	331.0
Flow Point(℃)	JIS K 2269	-7.5	-7.5
Clogging Point(℃)	JIS K 2288	-6	-7
carbon content of 10% residual oil (wt%)	JIS K 2270-2	0.04	0.04
Cetan Index	JIS K 2280-5	56.1	56.2
Kinematic viscosity(30℃)(mm²/s)	JIS K 2283	3.402	3.416
Sulfur Content (wt%)	JIS K 2541-6	0.012	0.012
Density (15℃)(g/cm³)	JIS K 2249-1	0.8301	0.8302

General Incorporated Association Nippon Kaiji Kentei Kyokai
Japanese Government Approved
Examination Report Examination Results December 6, 2021

Patent Application Number

Application Date : September 1, 2021
Reception Date : September 2, 2021

Reference Number : January, 2021
Receipt (document) Number : 22101640058
Application Number : (Patent Application)2021-163731
Access Code : 4A8D

Outline of Recycling Plant

Process : Carbonizing furnace / 1 furnace
Capacity of waste tire / 2t
Time required (Type A heavy oil) / approx. 4 hours
Maximum volume (Type A heavy oil) / 800L

Breakdown of recycling :
- Type A Heavy Oil / 40%
- Carbon Black / 40vol%
- Steel / 10vol%
- Off-gas / 10%
(*Residue / 0.02%)

24-hours operation : Oiling system carbonization furnace / 3 furnaces
(+2t/ 3 cartridges)
Waste tires cut/ 36t
Type A heavy oil refining volume/ approx. 14,400L

24-hours electricity generation : Generator/100kVA
Fuel Type A heavy oil/120L

Power generation : 1h/ 1000kw
24h/ 24,000kw

Auxiliary facilities :
- Plant building/storage tank/cartridge/
- Refiner/agitator/cooling tower
- Separation tank / Diesel generator /
- Check tank / Burner / Off-gas processor /etc.
- Various disaster prevention equipment, etc.

permits and licences :
- Application procedures for various permits under the Fire Service Law
- Notification of hazardous materials such as light oil, Type A heavy oil, etc. (Fire Service Act)
- Notification of Oil Sales Business
(Article 27, Paragraph 1 of the Act on Securing Oil Stockpiling, etc.)

Oiling equipment carbonization furnace

Cooling Tower

Refining Equipment

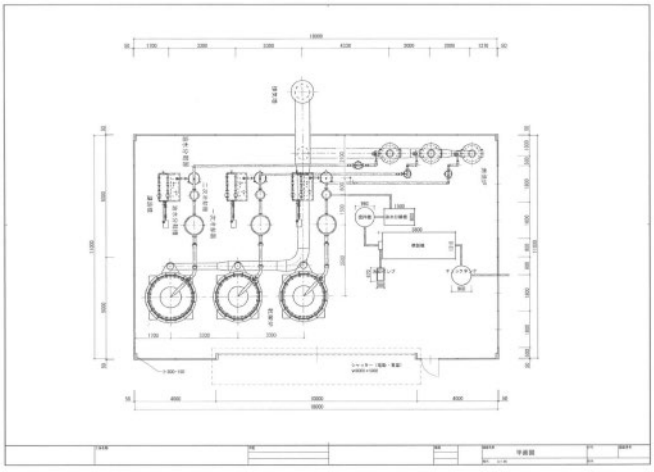
Offices and Subsidiaries

- Mobara City, Chiba
- Sodegaura City, Chiba
- Ichihara City, Chiba
- Minamisoma City, Fukushima
- Nagaoka City, Niigata

Here for
our homepage

https://ihq.co.jp/

Mobara Plant Outside Appearance



Mobara Plant New Drawing

Nagaoka Plant Outside Appearance

Diesel Electricity Generator

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Reuse & Recycle, Save Our Planet, Think Green...

SUSTAINABLE DEVELOPMENT GOALS

We support the UN SDGs.