

Waste to Energy Proposal China

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WEEE Profile

- WEEE, as defined in China, consists of the following⁽¹⁾:
 - Computer products
 - Telecom Equipment
 - Video, Audio, Radio and Television
 - Household Appliances
 - Instruments, Meters and Monitoring Equipment
 - Electrical Tools
 - Wiring and Cable
- 5,700,000 tonnes of WEEE produced in China annually,⁽²⁾ with 890,000 tonnes of eWaste being illegally imported from India and West Africa.⁽³⁾

A Growing Problem

- Concentration of eWaste dismantling sites can be found throughout the Guiyi area in Shantou region resulting in severe pollution.⁽⁴⁾
- Current solutions include recovery, incineration, and landfill that only account for 4,100,000 tonnes.
- Government is looking to Waste and Recovery Management, (WARM), programs in Europe and North America that are profitable.

WEEE Legislation Efforts in China

- ‘Clean Production and Solid Waste Law of the People’s Republic of China’ developed on January 1, 2009.
 - Article 5 calls for “recovery by multiple channels and centralized disposal of WEEE”
 - Regulations approved in February 2009 will be enforced as of January 1, 2011
- ‘Administrative Measures for the Prevention and Control of Environmental Pollution of Electronic Wastes’ enacted February 2008.
- Extended Producer Responsibility is a core concept; in-line with Europe and N.A.

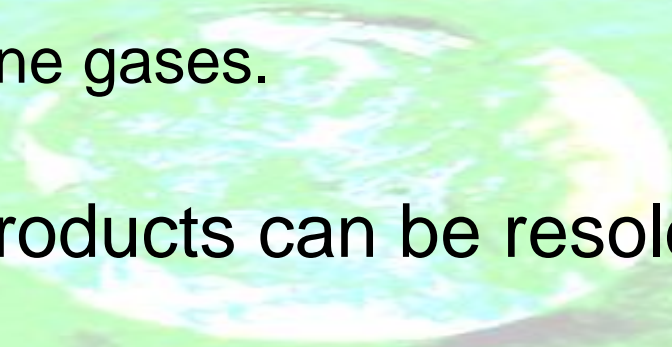
WEEE Legislation Cont'd

- China has also passed legislation equivalent to the EU End of Life programs for automobiles in China.
 - Program calls for recovery and recycling of tires, steel and plastics used in the manufacture of cars.
- Regulatory Authorities to enforce laws are:
 - Ministry of Environmental Protection
 - Ministry of Industry and Information Technology
 - National Development and Reform Commission

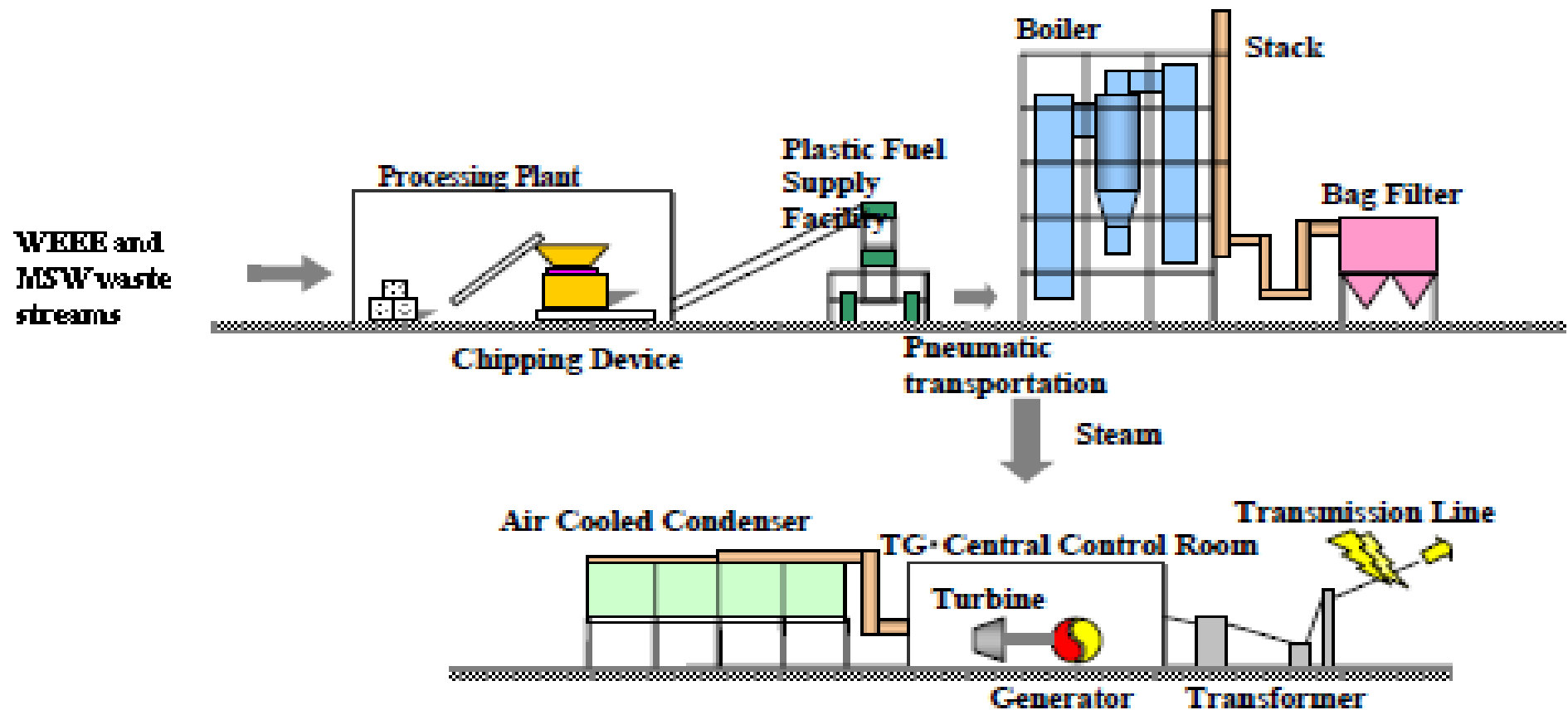


The Alko Power / Greenpath Eco Solution

Our Proposal

- Automated processing plants process WEEE streams and produce:
 - elemental metals like Copper, Aluminium, and Iron in purities ranging from 95% to 99%.
 - CFC and Pentane gases.
 - All recaptured products can be resold for profit.
 - Low value hydrocarbon solids are utilized to produce Syngas fuel that can be processed to create synthetic diesel.
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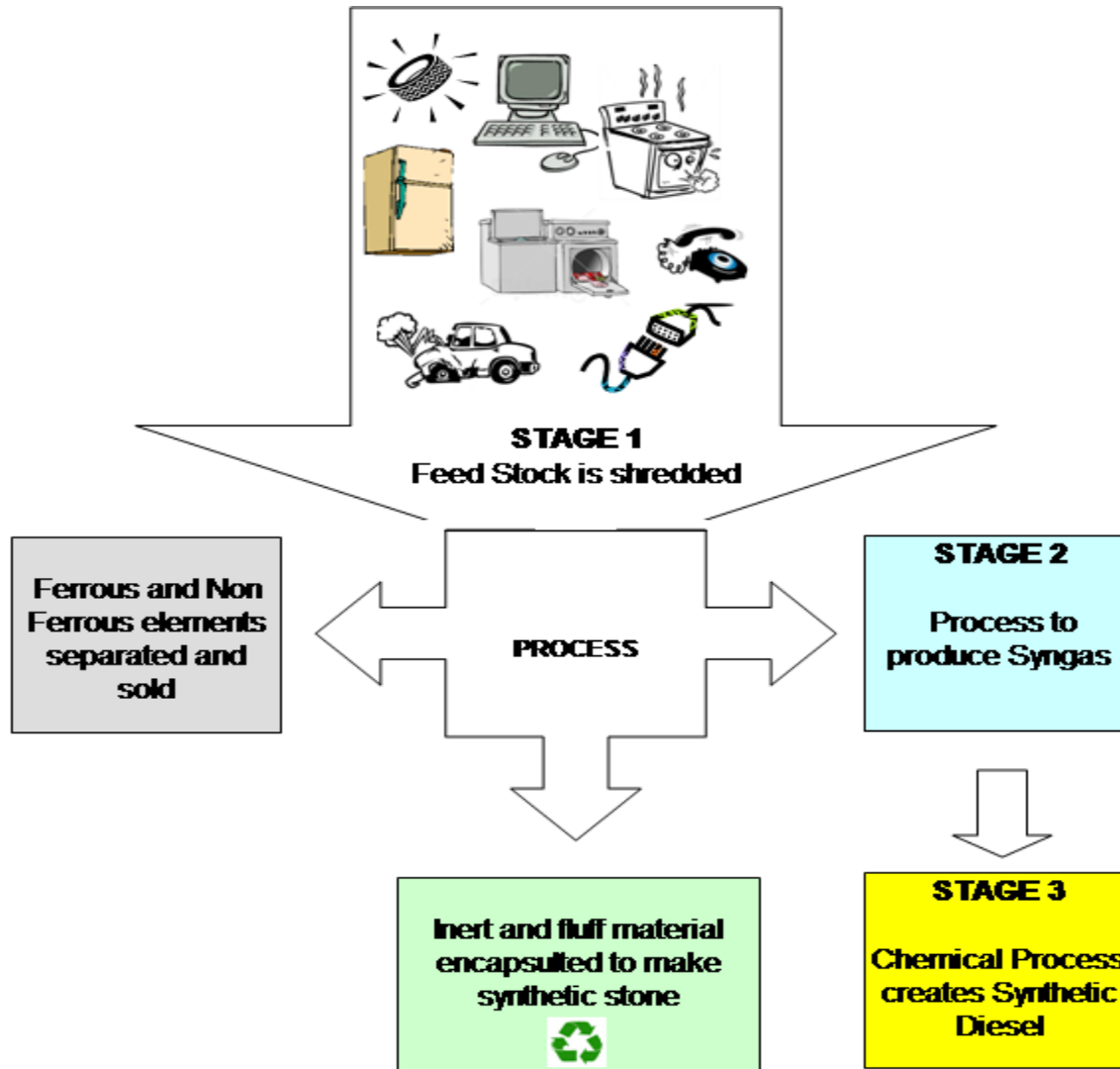
WTE Plant Overview



Advantages of our system

- Zero waste emissions and by-products meet or exceed current world standards.
- Addresses need for cost effective solution to a growing problem in China.
- Produces cheap alternative “Green” energy.
- Produces inexpensive road and building construction material.

How the System Works



Recycling Process

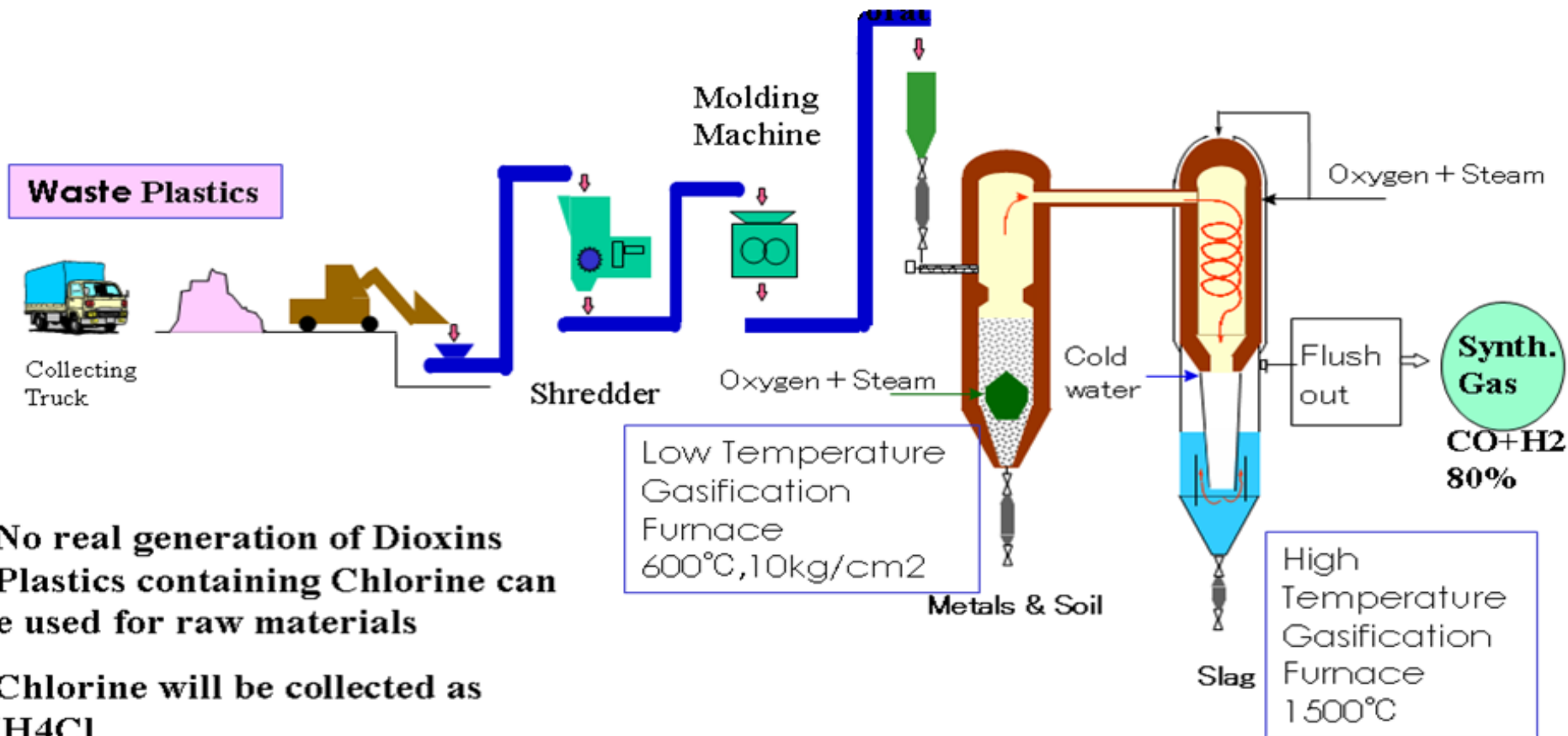
- Feedstock is shredded and automatically separated using eddy current processors, magnetic fields and induction fields.
- Metals are processed, and impurities removed.
- Plastic, rubber, gases and other calorific value items are used to produce synthetic fuels.

Encapsulation Process

- Inert materials like glass, ceramic, wood fibres, paper sludge, industrial abrasives are encapsulated.
- Binders harden in one hour and are three to five times stronger than concrete at 2/3 the weight with a lifespan of 75 years.
- Can be made impervious to water.
- Products can be sprayed on, mixed in situ or manufactured and distributed at location.

Pressurized Two Stage Gasification

Capacity: 10,000 tons/y for household plastic waste including PVC. Producing hydrogen gas for synthesizing ammonium. Demonstration operation was completed in Sept



- *No real generation of Dioxins
- *Plastics containing Chlorine can be used for raw materials

- *Chlorine will be collected as NH₄Cl

Energy Production Process

- Synthetic gas is produced from calorific material in gasification process.
- Proprietary technology converts syngas to syn-diesel.
- Syndiesel can be used in a generator to produce electricity or cracked for use as distillates.

What can we do?

- Profitable sales of recovered metals, synthetic stone and synthetic diesel.
- Reduce or eliminate production residues from all existing manufacturing processes or from nuisance items like plastic water bottles.
- Technology will produce synthetic diesel for less than \$0.50 USD per litre that can be used to generate electricity.
- Produce zero emissions from Greenpath process with minimal energy inputs.

Plant Specifications

- Plant capacities are modular and range from 3 tonnes/h to 100 tonnes/h.
- Average net power consumption: <600kW/h per module
- Ambient operating conditions: 4 C to 45 C at a maximum of 1000 m above sea level.
- Plant footprint for 100 metric tonnes per hour is approximately 500,000 sq ft.

Process Outputs

Recovered metals include Copper, 95% purity, Iron, 99% purity, and Aluminium, 95% purity

Recovered gases are:

- CFC R11, R22, R504, R600A
- Pentane 99% purity

Recycled plastics include polyurethane, (PUR), 99% purity.

Glass, paper waste, wood etc can be encapsulated using proprietary ceramic binders to make stone building products

Recovered Products

- Depending on type, quality and quantity of feedstock: Based on 100MT/h
 - Up to 8,000 barrels of synthetic diesel per day.
 - Up to 100,000 m² per year, per module of synthetic stone.
 - Up to 350,000 tonnes per year of granular slag for use in road base/building products.
 - 80 MW of power during peak periods;
 - 1000 L per day of potable water.

Current 30 MW Operating Facility



The Business Model

- Capital Cost of Plant is approximately \$5 - \$7 Million USD⁽⁷⁾ to process 1 MT per hour
- Breakeven, subject to feasibility assessment, is approximately 5 – 7 years.
- Required operating personnel 60 – 70 persons.
- Carbon credits can be sold on world market to improve ROI.



Next Steps

Formal Proposal

- Identify the potential location and assess:
 - Land requirements.
 - Proximity to waste and power infrastructure.
 - Availability, quantity and quality of WEEE.
 - Cost of current energy production
 - Costs of pollution
- Finalize costs for the plant including land and building construction.
- Submit formal business proposal to the Government of China.