



# MALAYSIA: REPACKAGED WASTE IMPORTS

## CASE STUDY OF PROCESSED ENGINEERED FUEL

March 2022



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MARCH 2022

*Lead Author*

*Mageswari Sangaralingam, Consumers' Association of Penang*



**IPEN** is a network of over 600 non-governmental organizations working in more than 120 countries to reduce and eliminate the harm to human health and the environment from toxic chemicals.

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**Consumers' Association of Penang (CAP)** focuses on independent testing and corporate advocacy to provide detoxification of public, daily consumer goods, as well as mainstreaming chemical management issues by fostering and developing civil corporation networks, all to achieve a “non-toxic national” vision.

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**Front cover photo:** (bottom) **Refuse derived fuel being baled.** Source: Pornthip Pongpakpatporn. (top) **Youth forage in plastic waste clogging a shoreline in Sabah, Malaysia.** Source: Christian Loader

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# INTRODUCTION

Ever since China closed its doors to 24 types of solid waste including plastic waste imports from January 2018, the global plastic recycling industry was thrown into chaos, revealing the true cost of rampant plastic production, its consumption, influx of single-use plastics as well as the problems and limitations of global recycling as a solution to the plastic waste problem.

Since then, plastic waste from the largest exporters such as the United States of America (USA), the United Kingdom and Europe has been diverted from China to other countries, which then magnified the problems of plastic pollution in developing countries especially in South East Asia. Malaysia, Philippines, Indonesia, Thailand and Vietnam were receiving waste that is not safely or economically recyclable.

The plastic waste entered developing countries under the pretext of “recycling”. But these countries soon became a dumping ground as the imports included mixed plastic waste, non-recyclable plastic waste, or plastic waste that was significantly contaminated with other wastes; or it contained toxic additives that make safe recycling impossible.

When Malaysia became the largest recipient of plastic waste in 2018, and the issue of illegal plastic waste recyclers, dump sites and open burning were highlighted by affected communities and civil society organizations, it attracted the attention of local and international media.

The Australian media such as the 60 Minutes programme revealed that mixed plastic waste has ended up in illegal dump sites and recycling plants in Malaysia. Containers of mixed and contaminated plastic waste from Australia were opened up by Malaysian authorities, and some were witnessed and recorded by Australian media.

However this was not the first instance that Australian waste export to Malaysia was revealed. In 2015, Sahabat Alam Malaysia (SAM), an environmental group revealed that wastes that were processed and repackaged as Processed Engineered Fuel (PEF) were being imported from Australia by declaring it as “solid fuel”.

The enforcement authorities in Malaysia eventually stopped such imports, asserting that the importing entity should have declared the consignment as solid waste instead of declaring it as solid or semi-solid fuels.

This paper documents the trade of Australian Processed Engineered Fuel (including Refuse Derived Fuel and/or Waste Derived Fuel) exported to Malaysia. In particular the paper will expound on ResourceCo, an Australian company which produces “fuels” from waste and has an alternative fuel processing plant in Ipoh, in the state of Perak, Malaysia.

## WASTE REPACKAGED AS ALTERNATIVE FUELS

Processed Engineered Fuel (PEF), Solid Recovered Fuel (SRF) and Refuse Derived Fuel (RDF) are different types of “alternative fuels” and have different properties. In general, these are fuels converted from general waste.

The Singapore Customs describes PEF as a plastic-based recycled combustible wastes with high calorific value (CV), comprising mainly hard and soft plastics (65%), with the remaining bulk made up of other allowable combustible waste materials, namely paper, wood and textile[[1]].<sup>1</sup> The CV of PEF is similar to the CV of coal. Hence PEF is used as an alternative fuel in energy-intensive industries, such as cement manufacturing and steel smelting.

RDF is a crude fuel typically derived from combustible waste from Municipal Solid Waste (MSW) or Commercial and Industrial (C&I) waste. It is typically pre-sorted and shredded residual waste with recyclables removed or comprise of the reject fraction of a Materials Recycling Facility (MRF) or a Mechanical Biological Treatment (MBT) operation.

The Department for Environment, Food & Rural Affairs, UK has identified the following six potential outlets for RDF, depending on its viability. [[2]]<sup>2</sup>

1. Industrial intensive users for power, heat or both.
2. Cement kilns.
3. Purpose built incinerators with power or power and heat.
4. Co-firing with coal at power stations.
5. Co-firing with fuels like poultry litter and biomass.
6. Advanced thermal technologies, such as pyrolysis and gasification.

SRF is produced to a fuel standard specified by a receiving plant. It is typically derived from pre-sorted C&I waste or rejects from MRF activities.

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1 Letter from Singapore Customs to ResourceCo Asia Pte. Ltd. dated 15 June 2015 (Ref No. C17.16.V15)

2 DEFRA UK. 2013. Mechanical Biological Treatment of Municipal Solid Waste. [https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment\\_data/file/221039/pb13890-treatment-solid-waste.pdf](https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/221039/pb13890-treatment-solid-waste.pdf) Accessed on 17 July 2021

The wastes repackaged as alternative fuels are problematic because of the inherent chemical mixtures and additives in the manufacturing process of plastics, besides multi-layered products such as disposable diapers and packaging. All these, in addition to products and materials that cannot be recycled or reused, end up in the highly complex waste stream, making them potentially toxic.

The pre-processing of waste also fails to effectively and fully extract PVC and other halogenated plastics which generate toxic emissions during incineration or co- processing in cement kilns.[[3]]<sup>3</sup>

The International Pollutants Elimination Network (IPEN) and International Pellet Watch report states that RDFs: “are simply repackaged wastes and fossil fuels at an intermediary stage before combustion. Their combustion releases are similar to, if not identical to the toxic emissions, particulate, and climate change gases as they would be if burned in their ‘loose mixed waste’ form”.[[4]]<sup>4</sup>

These shredded and pelletised non-recyclable residual waste are rebranded as a ‘product’ instead of a ‘waste’ for financial, regulatory, or subsidy purposes. The IPEN report concludes that these ‘plastics to fuels” practices are inefficient, polluting, and uneconomical. Recovering energy from burning plastic waste in incinerators and cement kilns as ‘alternate fuels’ or ‘refuse-derived fuels’ results in toxic emissions, toxic ash, high-intensity carbon releases, and wastes resources.

## TRACKING WASTE TRADE AND ITS LOOPHOLES

### *Harmonized System (HS) Code*

The Harmonized System (HS) is an international nomenclature for the classification of products. It allows participating countries to classify traded goods on a common basis for customs purposes. At the international level, the Harmonized System (HS) for classifying goods is a six-digit code system.[[5]]<sup>5</sup>

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3 Rached, S. 2020. Transposing the Basel Convention plastic waste amendments: challenges and recommendations. Global Alliance for Incinerator Alternatives. [https://www.no-burn.org/wp-content/uploads/Policy-briefing\\_Transposing-the-Basel-Convention-plastic-waste-amendments\\_November-2020.pdf](https://www.no-burn.org/wp-content/uploads/Policy-briefing_Transposing-the-Basel-Convention-plastic-waste-amendments_November-2020.pdf)

4 Takada, H. and Bell, L. 2021. Plastic Waste Management Hazards. International Pollutants Elimination Network (IPEN). <https://ipen.org/sites/default/files/documents/ipen-plastic-waste-management-hazards-en.pdf>

5 Harmonized Commodity Description and Coding Systems (HS) <https://unstats.un.org/unsd/tradekb/Knowledgebase/50018/Harmonized-Commodity-Description-and-Coding-Systems-HS>

The HS codes are essential to be able to search for plastic and waste trade imports and exports per country. For this paper, several HS codes were used to search for information on export of waste in the form of plastics and PEF/RDF.

Plastic waste categories can be found under HS codes:

**3915** for Waste, parings and scrap, of plastics. There is a whole range of associated categories of plastic waste under this category for different polymers and types of waste. 3915 is the base code with additional numbers added to this to describe the different categories of plastic waste.

Waste categories can be found under HS codes:

**3825** for Residual products of the chemical or allied industries, not elsewhere specified or included; municipal waste; sewage sludge; other wastes specified in note 6 to this chapter. Again, there are a whole range of different categories of residual waste products classified under this base code.

**382510** is the code for Refuse Derived Fuel

**3606** for Ferro-cerium and other pyrophoric alloys in all forms; metaldehyde, hexamethylenetetramine and similar products in tablets, sticks or similar forms, for use as fuel; alcohol-based fuels and prepared fuels of a similar kind, solid or in paste form; liquid gases and liquid fuels for lighters or igniters, in containers of  $\leq 300$  cc; resin torches, firelighters and the like.

The Singapore Customs issued a ruling on 15 June 2015, with a validity of three years, classifying PEF as HS Code **3606.90.10** as the PEF is considered a prepared fuel that is an “article of combustible materials”.[[6]]<sup>6</sup>

For waste export, the Basel Convention Annex II lists categories of wastes requiring special consideration. One is Y46: Wastes collected from households, another is Y18: Residues arising from industrial waste disposal operations.

The Department of the Environment of Australia in a letter to ResourceCo Asia (Australia) Pty Ltd on 6 July 2015 did not consider the SRF produced by ResourceCo to be hazardous. This decision was in response to the company’s enquiry about categorization of SRF and was made based on the information provided by the company in particular the levels of lead, cadmium and mercury.

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6 Letter from Singapore Customs to ResourceCo Asia Pte. Ltd. dated 15 June 2015 (Ref No. C17.16.V15)

This means that under the Australian Hazardous Waste (Regulation of Exports and Imports) Act 1989, the SRF exported to South East Asia by ResourceCo is not required to obtain a permit to export the material.[[7]]<sup>7</sup> However the company was advised to obtain advice from the country of import and transit countries to ensure compliance with international laws and regulations.

**Waste trade (HS3825)**

Following are trade of waste classified as HS3825 between Malaysia and Australia, and other countries including Indonesia, China, Singapore and Vietnam. Among all these countries, Indonesia was the highest exporter of HS3825 to Malaysia.

**Figure 1. HS3825 waste trade between Malaysia and Australia**

Year	Import		Export	
	Quantity (kg)	Value (USD)	Quantity (kg)	Value (USD)
2015	1645	10628	7702	47513
2016	1073529	40200	500	2089
2017	648	3971	0	0
2018	0	0	1900	9813
2019	1210	19421	0	0

Source: UN Comtrade: International Trade Statistics (<https://comtrade.un.org/data/>)

The waste export from Indonesia to Malaysia included “spent bleaching earth” which is a by-product from the oil palm processing industry. In 2018 and 2019, local environmental group in the state of Sabah in Borneo island complained that the waste products are being dumped indiscriminately leading to potential groundwater pollution. This waste if not handled in an environmentally sound manner is another issue of waste dumping.

<sup>7</sup> Letter from Hazardous Waste Section, Department of Environment, Australia to ResourceCo Asia (Australia) Pty Ltd. dated 6 July 2015.



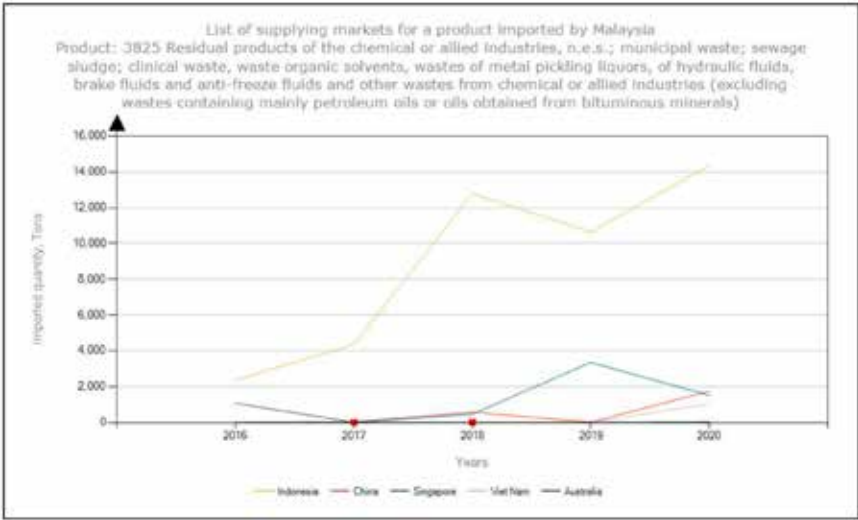


Figure 2. HS3825 waste imports to Malaysia from selected countries (in tons)

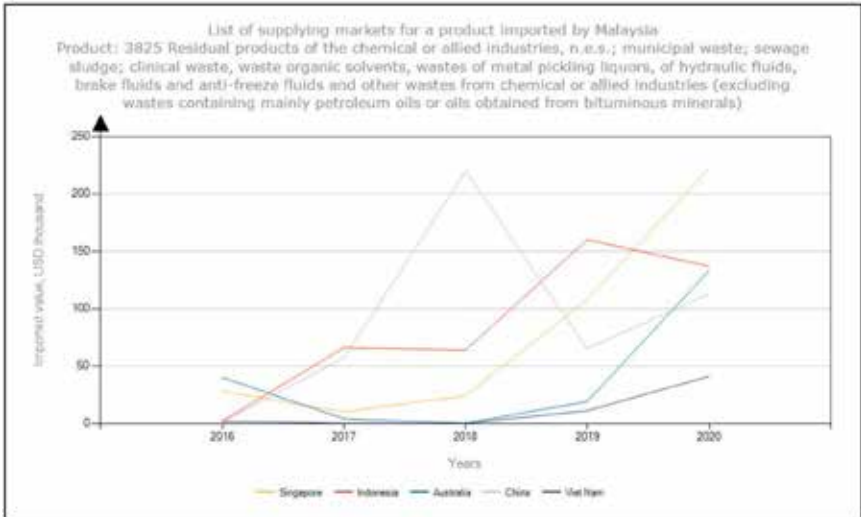
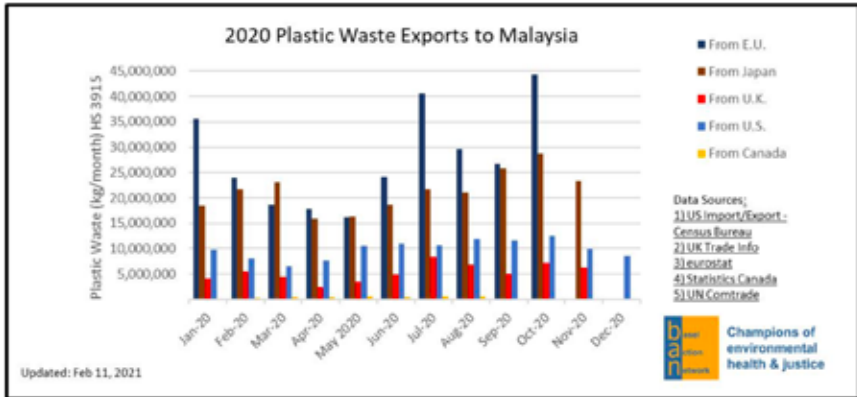


Figure 3. HS3825 waste import to Malaysia from selected countries (in USD thousand)

## Waste trade (HS3915)

Malaysia's imports of HS3915 in 2018 was 872,762 tons but reduced to 333,500 tons in 2019. It however increased again in 2020. ITC Trade Map indicates that Malaysia imported 32,504 tons of waste, parings and scrap of plastics (HS3915) from Australia in 2020. This makes up 6.8% of total 478,092 tons of Malaysia's total imports of HS3915 from the whole world in 2020.



**Figure 4. Plastic waste exports to Malaysia in 2020.** Source: Basel Action Network, 2021

## Figure 5. HS3915 waste trade between Malaysia and Australia

Year	Import		Export	
	Quantity (kg)	Value (USD)	Quantity (kg)	Value (USD)
2014	13,996,138	3,360,879	549,492	225,711
2015	16,762,437	2,730,787	263,918	154,885
2016	10,021,294	2,183,938	30,585	27,605
2017	32,199,160	6,333,714	42,666	36,311
2018	44,992,549	7,232,499	27,761	27,449
2019	32,332,830	7,154,588	612,300	281,982

Source: UN Comtrade: International Trade Statistics (<https://comtrade.un.org/data/>)

## Waste trade (HS3606)

As for imports of HS3606, there was no import from Australia since 2016. This cease in imports using the HS Code 3606, declaring it as solid fuel, could be due to the Department of Customs Malaysia stating that the waste brought in by ResourceCo Asia (M) should be declared as solid waste instead of declaring it as solid/semi-solid fuels. The Department had also found that the imported waste which was obtained from Resourceco Australia was not properly separated, thus causing a foul smell in its surrounding in the plant in IGB Industrial Park in Klebang, Ipoh, Perak.[[8]]<sup>8</sup>

**Figure 6. HS3606 waste trade between Malaysia and Australia**

Year	Import		Export	
	Quantity (kg)	Value (USD)	Quantity (kg)	Value (USD)
2014	14,341,959	\$956,018	-	-
2015	5,435,249	\$749,998	153,980	\$59,459
2016	-	-	14,000	\$16,175
2017	-	-	-	-
2018	-	-	-	-
2019	-	-	-	-

Source: UN Comtrade: International Trade Statistics (<https://comtrade.un.org/data/>)

## LOOPHOLES AND ENFORCEMENT ISSUES

A policy brief by the Global Alliance for Incinerator Alternatives (GAIA) states that a dangerous loophole threatens to weaken the new Basel Convention plastic waste amendment that came into force in January 2021 when plastic waste is pre-processed and exported as “alternative fuel” for burning. These waste-based fuels are still wastes that clearly fall within the scope of the Basel Convention, and trade controls apply.[[9]]<sup>9</sup>

As clarified in the GAIA policy brief, the Basel Convention listings clearly cover these waste-based fuels in Annex II to the Convention, under Y46 “Wastes collected from households” when the primary component is municipal waste, or the new plastic waste listing Y48, when the primary component is plastic waste from other sources. Prior informed consent is

<sup>8</sup> Malay Mail. 2015, Oct 20. Firm wrongly declared solid waste, says dept.

<sup>9</sup> Rached, S. 2020. Transposing the Basel Convention plastic waste amendments: challenges and recommendations. Global Alliance for Incinerator Alternatives. [https://www.no-burn.org/wp-content/uploads/Policy-briefing\\_Transposing-the-Basel-Convention-plastic-waste-amendments\\_November-2020.pdf](https://www.no-burn.org/wp-content/uploads/Policy-briefing_Transposing-the-Basel-Convention-plastic-waste-amendments_November-2020.pdf)

therefore required for all shipments of waste-based fuels. Thus, governments must clearly identify RDF, SRF, PEF, AFR and other waste-based fuels as wastes, and apply relevant Basel Convention trade controls.

Whether it is legal or illegal shipments of waste, both impact public health and the environment besides aggravating pollution in Malaysia due to weak environmental enforcement and compliance system. For instance, waste that legally enters and passes through the customs checks, if properly screened, can potentially end up being taken elsewhere and not processed in a designated facility or the factory which had the Approved Permit to import the waste.

Malaysia also lacks proper facilities and resources to check all the containers that enters the country through its many ports. The media reported that the scanning machines in Westport, a multi-cargo terminal in Port Klang, have not been operating for almost a year.

“The traffic lights (in front of the scanning stations) are off and lorries carrying the containers are allowed to pass freely. According to a document sighted by Malaysiakini, a customs official made a report to the upper management saying that “no images were scanned” by the three machines since December 2019.”[[10]]<sup>10</sup>

In addition, the enforcement agencies should also be consistent in ensuring that these waste shipments are properly handled, processed in designated facilities, and the residual wastes are disposed properly and not end up in dump sites or burned indiscriminately.

## THE FAILED RDF PLANT IN MALAYSIA

Recycle Energy Sdn Bhd (RESB) is a Malaysian company fully owned by Core Competencies Sdn Bhd, which owned the refuse-derived fuel (RDF) technology patent. RESB operated the first “waste-to-energy” plant in Malaysia. [[11]]<sup>11</sup>

The plant developed in a 28-acre plot in 2006 in Semenyih, Selangor operates based on RDF technology which requires pre-processing steps prior to the actual incineration and involves four major processing steps, namely, physical separation of incombustible materials, reduce moisture, decrease size and palletizing (to ensure size homogeneity).

10 Wong, K.H. 2021, Jan 4. Scanners not repaired for a year, possible avenue for smugglers at Westports. Malaysiakini. <https://www.malaysiakini.com/news/557495>

11 <https://www.facebook.com/Recycle-Energy-Sdn-Bhd-RDF-Plant-173035512759610/>

Its actual capacity is 1,000 tons of MSW/day and 8.9 MW of electricity generation. In the first few years of operation, it was reported to have been operating at 70% of its actual capacity, exporting approximately 5MW electricity to the grid.

In 2007, there was news report regarding mouldy, smelly mountain of rubbish emanating from the Semenyih RDF plant. Instead of being segregated and processed, rubbish was piling up in the facility's premises. Trucks loaded with rubbish were also observed leaving the facility and seen dumping the waste at various landfills.[[12]]<sup>12</sup>

When contacted, the plant's chief executive officer had informed the media that the plant was not yet 100 per cent complete because of delays in construction, hence about 15 per cent of the total waste that the plant received had been taken out of the plant for landfilling.

The New Straits Times reported that a search with the Companies Commission of Malaysia showed that up till the end of 2005, RESB registered losses of nearly RM6 million while Core Competencies registered losses of RM4.2 million.

In 2008, the media reported again that the municipality of Kajang still faced a mounting garbage problem as the Semenyih RDF plant which was meant for the exclusive use of the municipality was only able to process 70% of the waste sent there and this contributed to the delay in waste collection services in this area.[[13]]<sup>13</sup>

The company which has a 30-year concession with the Kajang Municipal Council had put the municipality in a bind due to its closure. The municipality was urged to review its contract with the company as the Council had to resort to other means of disposing municipal waste that was collected.[[14]]<sup>14</sup>

A cursory search on the internet found that the plant was shut down in 2015.[[15]]<sup>15</sup> A check with community members residing in the district revealed that the RDF plant is no longer in operation.

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12 John, E. Lim, J. Bendahara, A. 2007, Jan 21. News Focus: It stinks... but who's listening?. New Straits Times

13 Krishnan, G. 2008, Nov 8. Kajang facing garbage problem due to uncollected solid waste. The Star Online, Metro. <https://www.thestar.com.my/news/community/2008/11/08/kajang-facing-garbage-problem-due-to-uncollected-solid-waste>

14 Fernandez C. 2010, Jan 1. Closure of RDF plant puts council in a bind. The Star Online <https://www.thestar.com.my/news/community/2010/01/01/closure-of-rdf-plant-puts-council-in-a-bind>

15 <https://www.industryabout.com/country-territories-3/2221-malaysia/waste-to-energy/34769-kajang-incineration-plant-shutdown> accessed on 14 May 2021.

Touted as an environmentally friendly disposal of MSW and extraction of energy from waste for fuel, this RDF plant ended a failure.

## THE CONTROVERSIAL PEF PLANT IN MALAYSIA

ResourceCo is an Australian company involved in the recycling business, and is a large provider of alternative waste fuels. Information from promotional material of the company states that ResourceCo sources materials that can not be recycled from recycling facilities and waste collectors.

These waste materials comprising plastics, cardboard, timber, paper and textiles, with high embodied energy are shredded, screened, and separated by magnets and air before being shredded again to size the items into a 50-millimetre piece of fuel. Once the process is complete, the PEF is transported to Boral Cement or exported overseas to Southeast Asian cement kilns.[[16]]<sup>16</sup>

ResourceCo Asia Pte. Ltd.'s PEF plant in Ipoh, Malaysia established in 2011, has a 100,000-tonne-plus capacity and supplies the PEF to a number of cement kilns in Malaysia.

The company states that it does frequent sampling and testing of the product in their in-house laboratory. "Our stringent testing and monitoring procedures begin from the moment waste arrives at the plant to ensure any hazardous materials, e-waste or foreign objects, are not accepted in the plant. The product from beginning to end is manufactured and supplied under strict quality control and production procedures in accordance with our quality assurance systems," says Pavel Cech, Managing Director of ResourceCo Asia.[[17]]<sup>17</sup>

Controversy relating to the operations of ResourceCo Asia's PEF plant in Malaysia came to light when the Consumers' Association of Penang (CAP) received a complaint in May 2015 that the plant in IGB Industrial Park in Klebang, Ipoh in the state of Perak was importing waste from Australia and converting it to fuel for the use of LaFarge Cement Malaysia located in Kanthan, Perak. The complainant was concerned of toxic emissions from the cement plant.

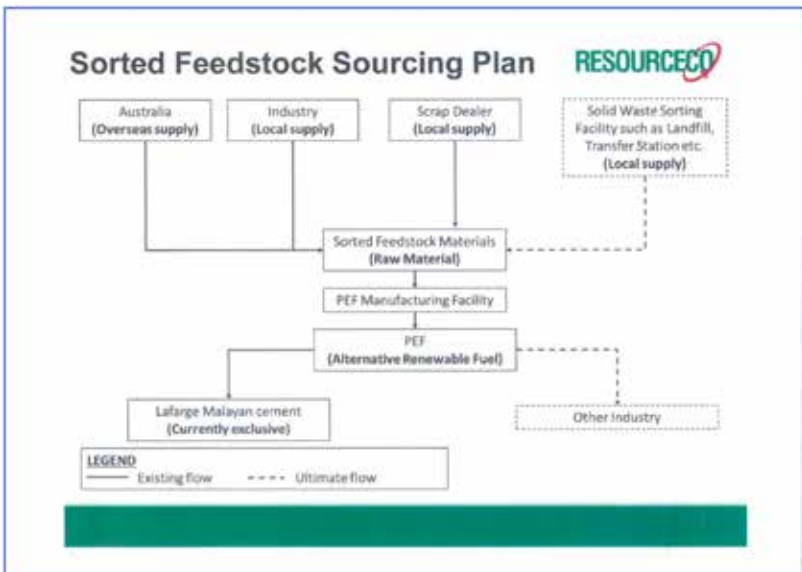
The complainant also revealed that ResourceCo Asia (M) Pte Ltd was importing the waste by declaring it as "solid fuel" using HS Code 3606.90.100 instead of using the HS code for waste.

16 Waste Management Review. 2018. "ResourceCo's expansion into alternative fuels" <https://wastemanagementreview.com.au/market-resources/> accessed on 10 November 2020.

17 Waste Management Review. 2019, Feb 6. "ResourceCo's rapid growth in Asia". <https://wastemanagementreview.com.au/resourceco-pef> accessed on 10 November 2020.



**Figure 7. ResourceCo Asia (M) Sdn Bhd facility in Ipoh, Malaysia.** Photo: Sahabat Alam Malaysia



**Figure 8. ResourceCo feedstock sourcing plan.** Source: ResourceCo information pack 2015

Following up the complaint, letters were written by Sahabat Alam Malaysia (SAM - Friends of the Earth Malaysia), a sister organization of CAP, to the Department of Environment (DoE) and the Royal Malaysian Customs Department, highlighting the Basel Convention Country Fact Sheet: Malaysia, which defines waste, hazardous waste and restrictions of transboundary movement. [[18]]<sup>18</sup>

### ***National Definition***

National definition of waste used for the purpose of transboundary movements of waste exists in Malaysia.

Waste is defined as any matter prescribed to be scheduled waste or any matter whether in a solid, semi-solid or liquid form, or in the form of a gas or vapor, which is emitted, discharged or deposited in the environment in such volume, composition or manner as to cause pollution. (Section 2, Environmental Quality Act 1974).

National definition of hazardous waste used for the purpose of transboundary movements of waste exists in Malaysia.

Hazardous waste is defined as any waste falling within the categories of waste listed in the First Schedule of the Environment Quality (Scheduled Wastes) Regulations 2005 stipulated under The Environmental Quality Act 1974.

### ***Restrictions on import for recovery***

Malaysia restricts the import of hazardous wastes and other wastes for recovery.

The Environmental Quality Act 1974, (Amendment 2005) Section 34B; and the Customs (Prohibition of Export) Order 1998 Amendment 2008. The restriction covers all countries.

Import of hazardous wastes for recovery requires written approval from Director General of Environmental Quality.

The Perak State DoE replied [[19]]<sup>19</sup> that a series of investigations were conducted and among actions taken were issuing a notice to the company that its premises is allowed only to receive and process sorted plastic, in

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18 2009. Basel Convention Country Fact Sheet. UNEP-CHW-CFS-Malaysia-1. English <http://www.basel.int/Countries/Countryfactsheets/tabid/1293/ctl/Download/mid/8404/Default.aspx?id=42&Ob jID=96>

19 Letter from Department of Environment Perak to Sahabat Alam Malaysia dated 10 Aug, 2015. Reference No. AS(B)A35/130/102 004 Jilid5(8).





**Figure 9. Protest action on 15 Oct 2015 by Sahabat Alam Malaysia staff and activists in front of ResourceCo Asia plant in Ipoh, Perak.**

Photo: Sahabat Alam Malaysia

accordance with the Environmental Assessment (EA) documentation that was submitted. The premises was required to return all the solid waste that was imported from Australia.

The premises was also required to submit a new site suitability assessment if the premises will be accepting local mixed waste such as fabric, carpet, etc. for processing. The Department stated that it would not support the company's application for a business licence if the premises does not comply with the conditions submitted in the EA.

The DoE of Malaysia, headquartered in Putrajaya also wrote that it had issued a directive that the importing and processing of waste from Australia was not allowed in the said premises. The process to repatriate the waste to Australia as provided for in Article 9 of the Basel Convention was being undertaken currently. [[20]]<sup>20</sup>

The DoE also informed that the premises had not submitted an Environmental Impact Assessment (EIA) report for its activity of processing solid waste to solid fuel. The premises was directed to submit an EIA report if it still proposes to continue its operation to use local or imported municipal solid waste.

Despite the actions and directives by the DoE, we still received tip-offs that ResourceCo has yet to return the waste to Australia. This prompted

<sup>20</sup> Letter from Department of Environment Malaysia to Sahabat Alam Malaysia dated Aug 14, 2015. Reference number: AS91/110/602/004Jld.22(18).

SAM staff and activists to conduct a protest action in front of the company on 15 October 2015, demanding that the waste is returned to Australia. We emphasised that Malaysia is not a dumping ground.

ResourceCo Asia wrote to SAM on 19 October 2015 explaining that their mission is to take non-recyclable waste and convert it into a solid fuel that can be used to replace coal used in the manufacture of cement.

The company pointed out that the feedstock it imports is not waste, and that the waste had been through material recovery facilities in source countries to remove organics, metals, glass and any other hazardous materials before the feedstock is shredded, sealed and sent to Malaysia. The company also stated that it is now moving to locally sourced waste.

Our follow-up found that the National Solid Waste Management Department of Malaysia had reviewed the case involving the 7,200 metric tonnes of solid waste detained by the Perak State DoE in ResourceCo's premises in Ipoh, Perak and 42 containers of waste detained by the Customs Department in Port Klang.[[21]]<sup>21</sup>

Based on the views of the Department's legal advisor, it was decided that the company is given a one-off permission to process the detained solid waste within 60 days and not allowed to import any more waste. The decision was also made considering the detained waste might leach out and cause pollution.

The process for repatriation of waste was also long and the Malaysian government had yet to receive the consent of the Australian government.

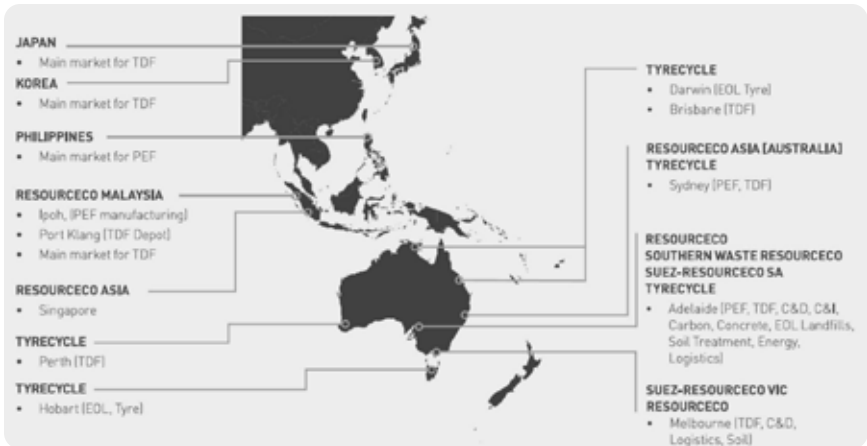
Although our attempts to repatriate the waste to Australia had failed, we still managed to stop further imports of PEF which was being declared as solid fuel.

## IMPORT OF TYRE-DERIVED FUEL

Malaysia requires special consideration for waste tyre which is subjected to transboundary movement. The Basel Convention Country Fact Sheet for Malaysia indicates "Prohibition on import of waste tyre".[[22]]<sup>22</sup> Prior informed consent is therefore required for the shipment of tyre-derived fuel, which are essentially shredded scrap or waste tyres.

21 2016, Jan 8. Email correspondence.

22 2009. Basel Convention Country Fact Sheet. UNEP-CHW-CFS-Malaysia-1.English <http://www.basel.int/Countries/Countryfactsheets/tabid/1293/ctl/Download/mid/8404/Default.aspx?id=42&ObjID=96>



**Figure 10. ResourceCo Group operations in Asia.** Source: ResourceCo brochure (<https://resourceco.com.au/>)

The import of tyre-derived fuel from Australia came to light when the media reported a fire in late June 2021 at Jalan Pulau Carey, Teluk Panglima



**Figure 11. Hee Loy Sian (right) talking to fire and rescue officers at the warehouse near the jetty where the tyres have been burning for four days.** Photo: Bernama

Garang, which was still belching plumes of black smoke despite efforts from firefighters to put out the fire.[[23]]<sup>23</sup>

Bernama, the national news agency reported that initial investigation by the authorities found that the warehouse owner here had a valid approved permit (AP) where the shredded tyres were shipped from Australia to be used as fuel for a plastic recycling factory in Chemor, Perak and a cement factory in Langkawi, Kedah.[[24]]<sup>24</sup>

From this statement, the import of the shredded tyres or tyre-derived fuel can be traced back to ResourceCo Asia plant in Ipoh, Perak.

## CO-PROCESSING IN MALAYSIAN CEMENT PLANTS

Cement production consumes large quantities of raw materials and fuels. Alternative fuels are being sourced to replace traditional fossil fuels in the operation of cement plants worldwide. Waste that has significant calorific value is being converted to be used as cement kiln fuel or waste streams that have suitable chemistry are used as raw material replacements.

Generally, the principal components of the alternative fuel stream comprise of biomass and solid shredded waste. The biomass could be in the form of timber waste or suitable agriculture waste. The solid shredded waste also known as PEF/RDF/SRF is largely derived from commercial and industrial waste; municipal solid waste; and construction and demolition waste.

Desk research found that among the alternative fuel used in co-processing comprise of fly ash, copper slag, waste oil, RDF, saw dust, soap sludge, scheduled wastes, construction and demolition (C&D) waste, recycled asphalt pavement, waste-water sludge. These are predominantly sourced locally.

In Malaysia, nine cement plants are listed by the Department of Environment as carrying out co-processing activities.

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23 2021, Jun 27. Chen, G. Blazing crumb rubber pile in Teluk Panglima Garang expected to burn for two days. The Star Online, Metro News. <https://www.thestar.com.my/metro/metro-news/2021/06/27/blazing-crumb-rubber-pile-in-teluk-panglima-garang-expected-to-burn-for-two-days>

24 2021, Jun 29. Bernama. Illegal structures at private jetty to be torn down. Free Malaysia Today. <https://www.freemalaysiatoday.com/category/nation/2021/06/29/illegal-structures-at-private-jetty-to-be-torn-down/>

**Figure 12. List of cement plants that carry out co-processing activities in Malaysia. [[25]]<sup>25</sup>**

No	State	Name of Premises	Address
1	Pahang	Pahang Cement Sdn. Bhd.	P.O Box 232, Bukit Sagu 4, Kuantan, Pahang
2	Perak	Perak Hanjoong Simen Sdn. Bhd.	2764, Mukim Kg Buaia, Batu 14 Padang Rengas, 33700 Kuala Kangsar, Perak
3	Perak	Tasek Corporation Berhad	No. 5, Persiaran Tasek, 31400 Ipoh, Perak
4	Perak	Associated Pan Malaysia Cement Sdn. Bhd. (formerly LaFarge Kanthan)	13, 1/4 Miles, Jalan Kuala Kangsar, Perak
5	Perak	Hume Cement Sdn Bhd	Lot 300254, 300255, 300256 Mukim Teja, Daerah Kinta, 31610 Gopeng, Perak
6	Perlis	Negeri Sembilan Cement Industries Sdn Bhd	(Perlis Plant) Bukit Keteri, Chuping, Perlis
7	Negeri Sembilan	Negeri Sembilan Cement Industries Sdn. Bhd. (KP)	Lot 3323, Mukim Kepis Kuala Jelai, P.O. Box 22, Bahau, Negeri Sembilan
8	Sarawak	CMS Cement Industries Sdn Bhd	Lot 571, Blok 4, Sentah Segu L/D, Jalan Mambong Off Jalan Puncak Borneo, 93250 Kuching, Sarawak
9	Sarawak	CMS Cement Industries Sdn Bhd	Lot 766, Block 20, Kemena Land District, Kidurong Industrial Estate, 97000 Bintulu, Sarawak

In May 2019, Malayan Cement Berhad, formerly known as Lafarge Malaysia Berhad was acquired by YTL Cement Berhad. [[26]]<sup>26</sup> The 2030 Plan for Lafarge Malaysia Berhad targets the use of 80 million tonnes of waste-derived resources per year. [[27]]<sup>27</sup>

The plant run by Associated Pan Malaysia Cement Sdn. Bhd. which was formerly known as LaFarge Kanthan receives PEF from ResourceCo Asia plant in Ipoh and also co-processes tyre-derived fuel from Australia. The ResourceCo Asia plant has been using local plastic waste and imported

25 Department of Environment, Malaysia. <https://www.doe.gov.my/portalv1/en/senarai-kilang-simen-yang-menjalankan-aktiviti-co-processing> accessed on 19 May 2021

26 [http://ytlcement.my/wp-content/uploads/2020/10/Malayan-Cement-Berhad\\_Corporate-Governance-Report-2020.pdf](http://ytlcement.my/wp-content/uploads/2020/10/Malayan-Cement-Berhad_Corporate-Governance-Report-2020.pdf)

27 Lafarge Malaysia Berhad. (2017). Lafarge Malaysia Berhad Sustainability Statement 2017. [http://ytlcement.my/wp-content/uploads/2019/12/Sustainability-Statement-from-Lafarge\\_AR\\_2017.pdf](http://ytlcement.my/wp-content/uploads/2019/12/Sustainability-Statement-from-Lafarge_AR_2017.pdf)

dry materials such as plastic, papers, clothes and wood to process into PEF.

After a visit to the ResourceCo Asia plant in July 2019, the Malaysian Housing and Local Government Ministry announced that it was looking to tap the mountains of plastic trash in the country as an alternative fuel and source for producing cement. The minister said the technology could help the government cut down the illegal plastic garbage pile nationwide. [[28]]<sup>28</sup>

The co-processing at Tasek Corporation Berhad plant in Ipoh involves using main alternative raw materials such as fly ash and copper slag, whilst main alternative fuels are waste oil, other RDF, saw dust and soap sludge. [[29]]<sup>29</sup> The company's 2019 Annual Report reported increased use of scheduled wastes as alternative raw materials in cement manufacturing process, from 10,000 metric tons (MT) in 2017 to 24,000MT in 2019.

Hume Cement Industries Sdn Bhd reported in its Sustainability Report for 2018[[30]]<sup>30</sup> and 2019[[31]]<sup>31</sup> of conducting research and development to increase the share of alternative fuels in various ways, including waste to energy, biomass, biogas and solid recovered fuels in order to increase the flexibility of fuel types and reduce the use of coal.

Negeri Sembilan Cement Industries Sdn Bhd which has two plants, one in Perlis and one in Negeri Sembilan, incorporates recycled materials such as fluid cracking catalyst and fly ash for its co-processing. The company is reportedly studying paddy husk as alternative fuel to substitute coal and diesel. [[32]]<sup>32</sup>

CMS Cement Industries (CMSCI) in the state of Sarawak conducts co-processing for both raw material replacement in clinker production and as alternative fuel, with research being conducted. Materials used as raw material replacement are industrial sludges i.e. calcium hydroxide, spent garnet, silico manganese slag, sludge, silicon sludge, fluoride sludge supplied by other plants for instance cement, construction materials, concrete plants under Cahaya Mata Sarawak.

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28 2019, July 17. Bunyan, J. Putrajaya studying plastic trash-for-fuel tech to clear illegal dump sites. Malay Mail. <https://www.malaymail.com/news/malaysia/2019/07/17/putrajaya-studying-plastic-trash-for-fuel-tech-to-clear-illegal-dump-sites/1772278>

29 Tasek Corporation Berhad. 2019. Tasek Corporation Berhad Annual Report 2019 (Vol. 1962010001). [http://www.tasekcement.com/tasek\\_annual\\_report/2019/AR2019.pdf](http://www.tasekcement.com/tasek_annual_report/2019/AR2019.pdf)

30 <https://humeind.com/bursa/Narra-announcements/Annual-Reports/HIB-2018-Annual-Report.pdf>

31 [http://disclosure.bursamalaysia.com/FileAccess/apbursaweb/download?id=196723&name=EA\\_DS\\_ATTACHMENTS](http://disclosure.bursamalaysia.com/FileAccess/apbursaweb/download?id=196723&name=EA_DS_ATTACHMENTS)

32 <https://www.cima.com.my/sustainability>

CMSCI had started trials for processing tyre-derived fuels (TDF) in 2015 by burning locally sourced small quantities of shredded tyres to manufacture clinker. In 2018, CMSCI was given approval by the Department of Environment to proceed with the trial of 300 MT of TDF with the intention of eventually moving into the commercial production of TDF. In 2019, the Mambong Integrated Plant co-processed 104.75 MT of TDF for trial purposes and another 4.8 MT in 2020. The plant has now established a long-term TDF supply contract with a Sarawak based company. [[33]]<sup>33</sup>

## EMISSIONS MONITORING OF CEMENT PLANTS IN MALAYSIA

The general principle for co-processing of scheduled wastes and other wastes in cement kilns in Malaysia outlined that it should be in line with the Basel and Stockholm Conventions and other relevant international environmental agreements. Waste should be co-processed in cement kilns when more ecologically and economically robust methods of recovery are not available. [[34]]<sup>34</sup>

Continuous emissions monitoring in cement plants are lacking. In Malaysia, emissions of metals and their compounds, HCl, HF, NH<sub>3</sub>, dioxin and furan are only subjected to periodical monitoring, at a minimum once per year. This is grossly inadequate for toxic emissions that have adverse impacts to human health and the environment.

Under the Environmental Quality (Clean Air) Regulations 2014, the emission limits from cement production for all sizes of cement plants, including their monitoring are as follows.

**Figure 13. Emission limits from cement production in Malaysia**

Pollutant	Limit value	Monitoring
Sum of NO and NO2 expressed as NO2	800 mg/m <sup>3</sup>	Continuous*
Total PM	50 mg/m <sup>3</sup>	Continuous*
Mercury	0.05 mg/m <sup>3</sup>	Periodic
PCDD/PCDF (dioxins/furans)	0.1 ng TEQ/m <sup>3</sup>	Periodic

\* Averaging time for continuous monitoring is 30 minutes

33 <http://cmsb.irplc.com/investor-relations/sustainability2020/CMS-SR2020.pdf>

34 Department of Environment Malaysia. 2015. Guidelines on Environmentally Sound Co-Processing of Scheduled Wastes in Cement Industry.

The emissions limit for new and existing cement plants in Malaysia, implementing co-processing of scheduled wastes are as follows:

**Figure 14. Emissions limit for cement plant implementing co-processing of scheduled wastes[[35]]<sup>35</sup>**

No.	Parameter	Init	Limit
1.	Dust	-	50 mg/Nm <sup>3</sup>
2.	Sulphur Dioxide	SO <sub>2</sub>	400 mg/Nm <sup>3</sup>
3.	Nitrogen Oxides	NO <sub>2</sub>	800 mg/Nm <sup>3</sup>
4.	Hydrogen Chloride	HCl	10 mg/Nm <sup>3</sup>
5.	Volatile Organic Compound	TOC	20 mg/Nm <sup>3</sup>
6.	Chlorine	Cl	200 mg/Nm <sup>3</sup>
7.	Mercury	Hg	0.05 mg/Nm <sup>3</sup>
8.	Cadmium	Cd	< 0.05 mg/Nm <sup>3</sup>
9.	Thallium	Tl	
10.	Arsenic	As	Total 2.5 mg/Nm <sup>3</sup>
11.	Cobalt	Co	
12.	Lead	Pb	
13.	Copper	Cu	
14.	Antimony	Sb	
15.	Chromium	Cr	
16.	Nickel	Ni	
17.	Vanadium	V	
18.	Manganese	Mn	
19.	Zinc	Zn	100 mg/Nm <sup>3</sup>
20.	Hydrogen Fluoride	HF	1 mg/Nm <sup>3</sup>
21.	Dioxin & Furan	D & F	0.1 ng/Nm <sup>3</sup>
22.	Smoke (Ringelmann Chart)	-	No. 1
23.	Ammonia & ammonia compound	NH <sub>3</sub>	30 mg/Nm <sup>3</sup>
24.	Benzene	-	5 mg/Nm <sup>3</sup>

<sup>35</sup> Department of Environment Malaysia. 2015. Guidelines on Environmentally Sound Co-Processing of Scheduled Wastes in Cement Industry.



Hahladakis et. al. noted that in the search for high calorific value fuels, cement kilns still have to limit their use of waste plastics due to the corrosive effects of the thermal degradation products, as halogens emitted from the combustion of plastic waste can also cause corrosion in incinerators and other thermal facilities. Chlorine and bromine may accumulate in cement kiln systems limiting their capacity for thermal recovery of plastic. [[36]]<sup>36</sup>

“Uncontrolled combustion of plastic waste and, in particular of those containing halogens such as, PVC, polytetrafluorethylene/teflon, plastic containing brominated flame retardants, etc. can cause emissions of hazardous substances, e.g. acid gases and unintentional persistent organic pollutants (POPs) such as dioxins”, Hahladakis et. al. added.

The implications are of utmost concern for the environment and human health if the cement kilns do not operate to BAT BEP standards when using halogenated (bromine, chlorine, fluorine) plastic as fuel. These halogenated plastics may end up in the RDF as mixed plastics are shredded and pelletised.

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36 Hahladakis, J., Velis, C., Weber, R., Iacovidou, E., and Purnell, P. 2018. An overview of chemical additives present in plastics: Migration, release, fate and environmental impact during their use, disposal and recycling. *Journal of Hazardous Materials* 344 (2018) 179–199.

# CONCLUSION

Malaysia allows plastic waste imports with Approved Permits given to importers for clean and homogenous plastic waste generated from industrial facilities and post consumer wastes. Evidences on the ground show that there is plastic waste leakage or mismanagement, illegal trade and false declaration in the bills of lading.

The Malaysian government is also convinced that conversion of waste to PEF as an alternative fuel and source for producing cement is viable and the way forward to clear the residual waste from plastic recycling plants and clean up illegal plastic waste dumps in the country.

Another of issue of concern is that although the Australian government announced its waste export ban in 2020, but in reality the Australian government may continue to export their waste as a 'fuel product'. Australia will be circumventing its waste export ban by shipping these "energy-from-waste" as products to other regions.

This is confirmed by a response from a spokesperson on behalf of the Australia's Federal Minister for the Environment, Sussan Ley, stating: "The Australian Government recognises that waste-to-energy can play a part in Australia's long-term waste solution, where it is consistent with the waste hierarchy and does not divert valuable materials away from recycling. Under Australia's export bans on waste plastic, exporters can continue to export waste plastics that have been processed with other materials into processed engineered fuel. They will need a licence to export the waste and to declare each consignment to the department. Licence applications are assessed by the department to ensure exports are appropriate."<sup>37</sup>

In view of this, there is a need to establish a single HS code for RDF, PEF and all other solid fuels made from waste. These wastes which are repackaged shredded wastes should be regulated as wastes and not products of "energy-from-waste" or "solid fuel". They should also require Basel Convention prior informed consent as co-processing in cement kilns are not destined for environmentally-sound recycling.

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37 Stacey, L. June 21, 2021. Toxic Waste Rebranded: Australia bans Third World dumping, leaves giant toxic loophole. <https://www.michaelwest.com.au/toxic-waste-rebranded-australia-bans-third-world-dumping-leaves-giant-toxic-loophole>





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[www.ipen.org](http://www.ipen.org)

[ipen@ipen.org](mailto:ipen@ipen.org)

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