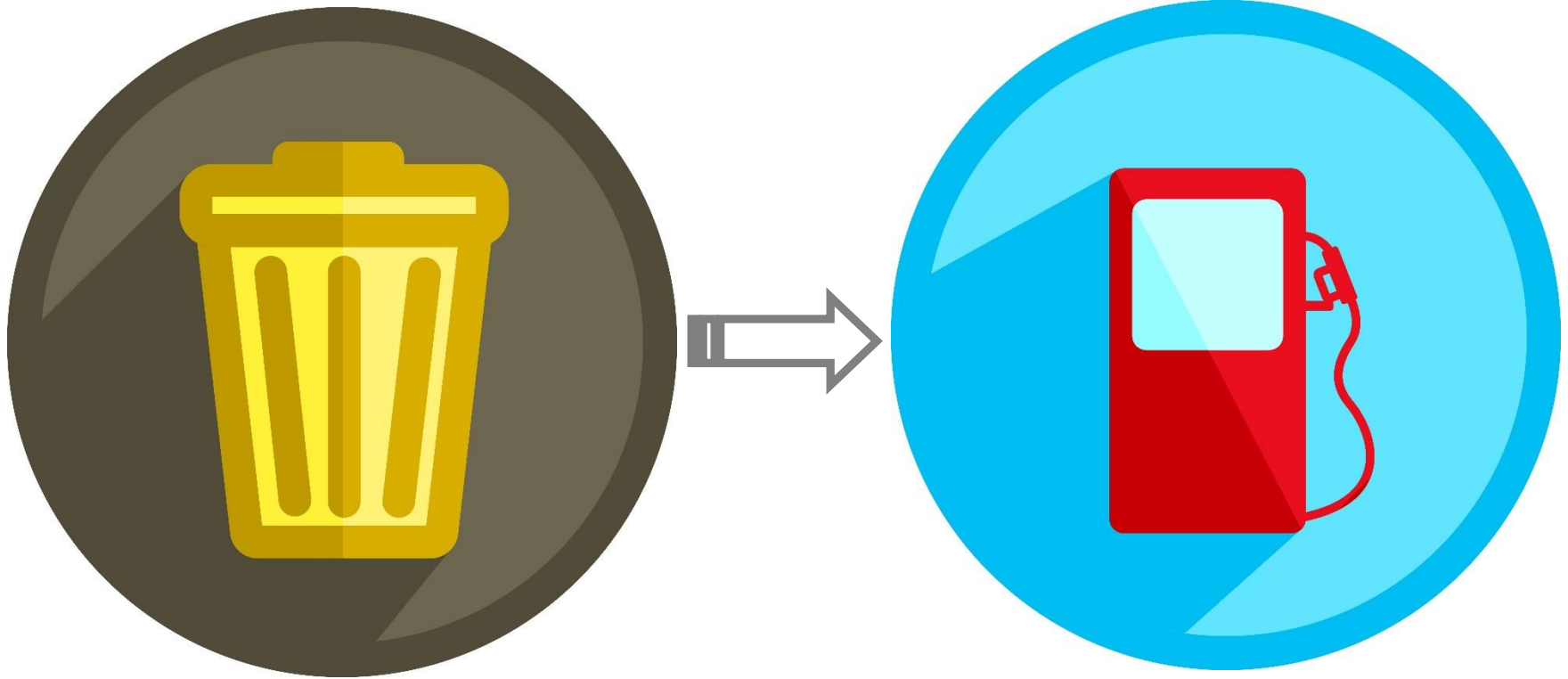


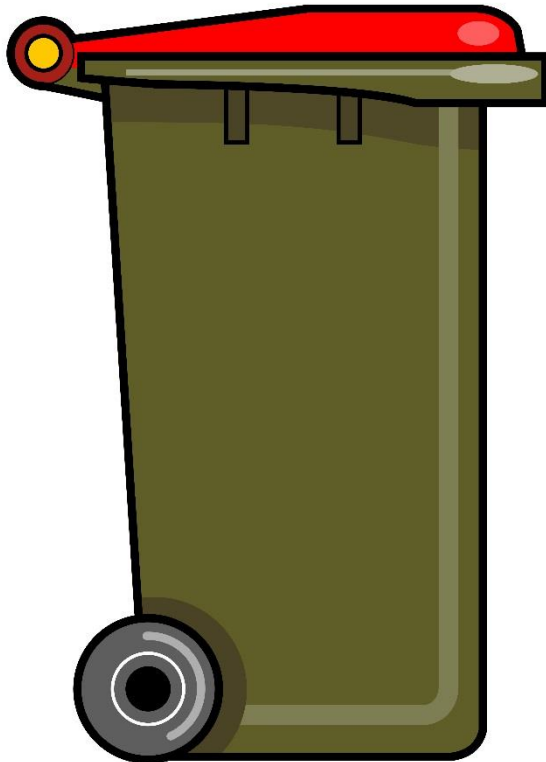
# *End of Life Plastic To Liquid Fuel*



# *We Are Motivated By Irony*



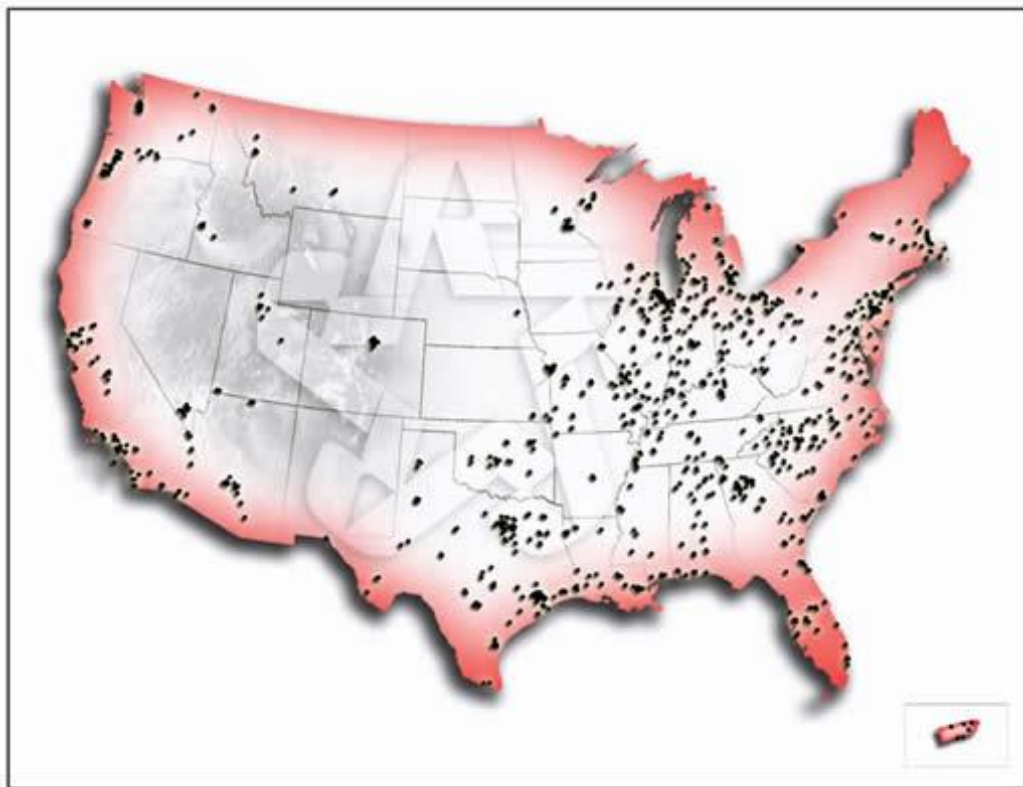
## *Even More Ironic: Annually We Landfill*



- 251 Million Tons of Garbage  
*that includes:*
- 43 Million Tons of Plastic<sup>1</sup>  
*which is the equivalent of:*
- 206 Million Barrels of Crude Oil  
*with a current market value of:*
- \$18 Billion (does not include post-industrial)

<sup>1</sup>U.S EPA MSW Report 2012

# *Disposal Is Out Of Fashion*



**Less Than 2,000 Landfills  
Are Licensed To Operate**

**Transportation And Labor  
Costs Continue To Escalate  
For Waste Haulers**

**Capital Investment Increasing  
At Sortation Facilities For  
High Value Material Recovery**

# *Recycling Is Accepted As Good Practice*



**Yet Americans Only Recycle 34%  
Of The Total Waste That They  
Generate<sup>1</sup>**

**And 93% Of All Plastic And Rubber  
Manufactured Continues To Be  
Landfilled**

**Is There A Smarter Approach To  
Managing End Of Life Polymers?**

<sup>1</sup>U.S EPA MSW Report 2012

# *Energy Recovery: Gaining Traction*



**Waste To Energy Investment  
Is Projected To Grow 62% Per  
Annum Worldwide Over The  
Next 3 Years<sup>1</sup>**

**Closing The Loop On Waste  
Is An Environmentally  
Responsible Alternative To  
Disposal And Recycling**

<sup>1</sup>Frost & Sullivan Report On Global WTE Investment, January 2014

# *Challenge: Recycling Polymers Requires Sorting*

Resin Code	Core Polymer	Common Examples
1	PET / PETE	Water-Juice-Soda Bottles, Food Packaging
2	HDPE	Milk Jugs, Rigid Bottles, Yogurt Cups, Buckets, Bags
3	PVC	Blister Packaging, Plumbing, Furniture, Play Pools
4	L/LDPE	Bubble Wrap, Sheet Film, Foam Protectors
5	PP	Bottle Caps, Jar Lids, Packaging, Housewares
6	PS	Packing Peanuts, Cups, Dinnerware, Styrofoam
7	Other	Thermosets, Hoses, Toys, Carpet, Tires, Shredder Fluff

# *The Waste System Is Designed To Bypass Recovery Of Most Polymer Types*

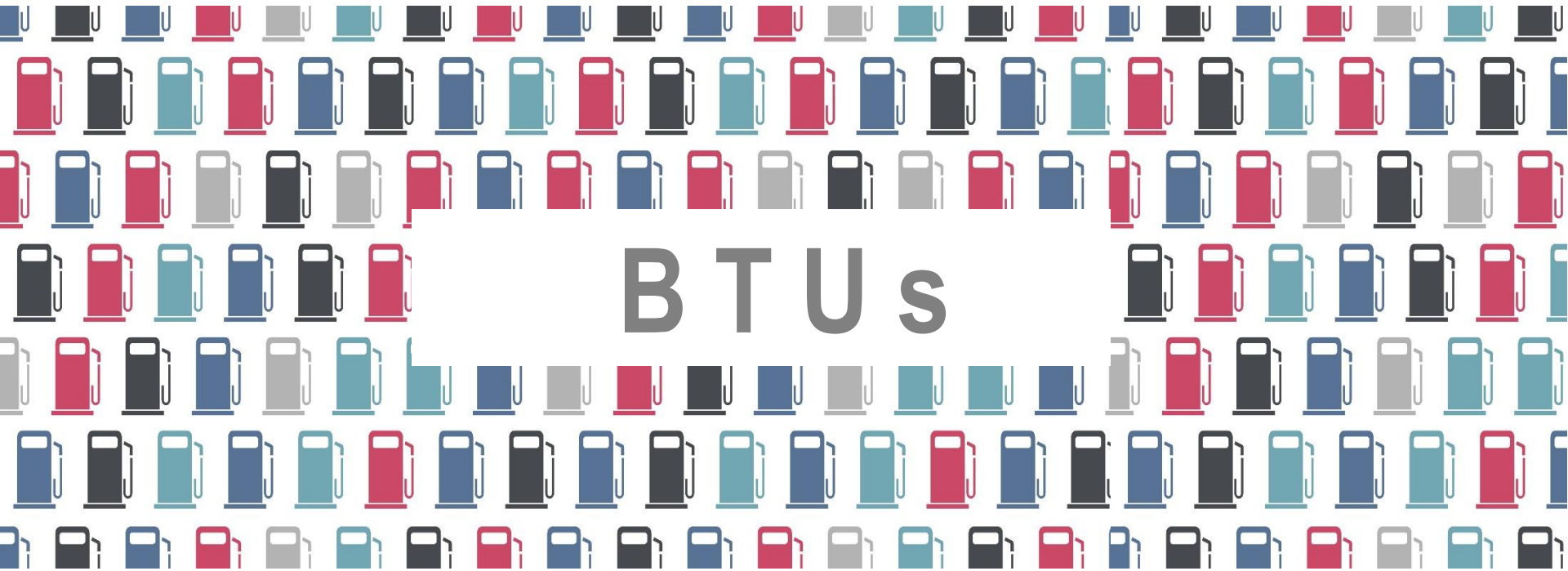


How To Recover A Polymer Rich, Complex Item From Here? (and not lose money)

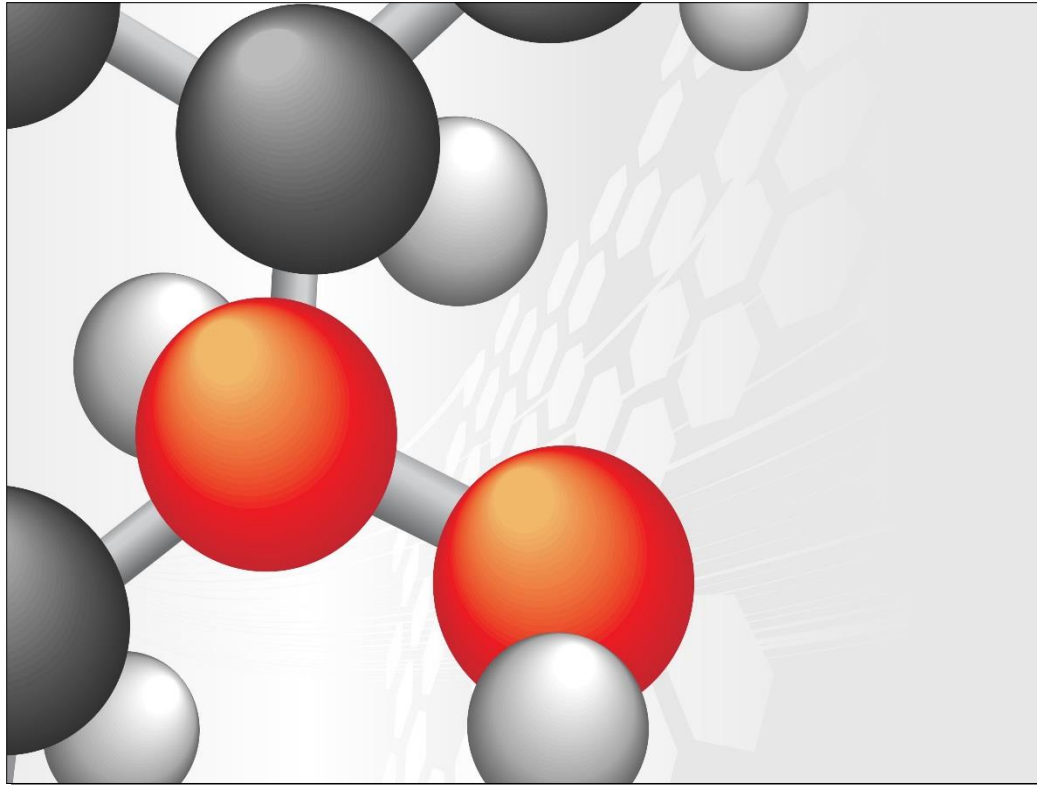
# Perhaps Low-To-No Separation Is In Order



# *This Is How RES Polyflow Views Plastic Waste*

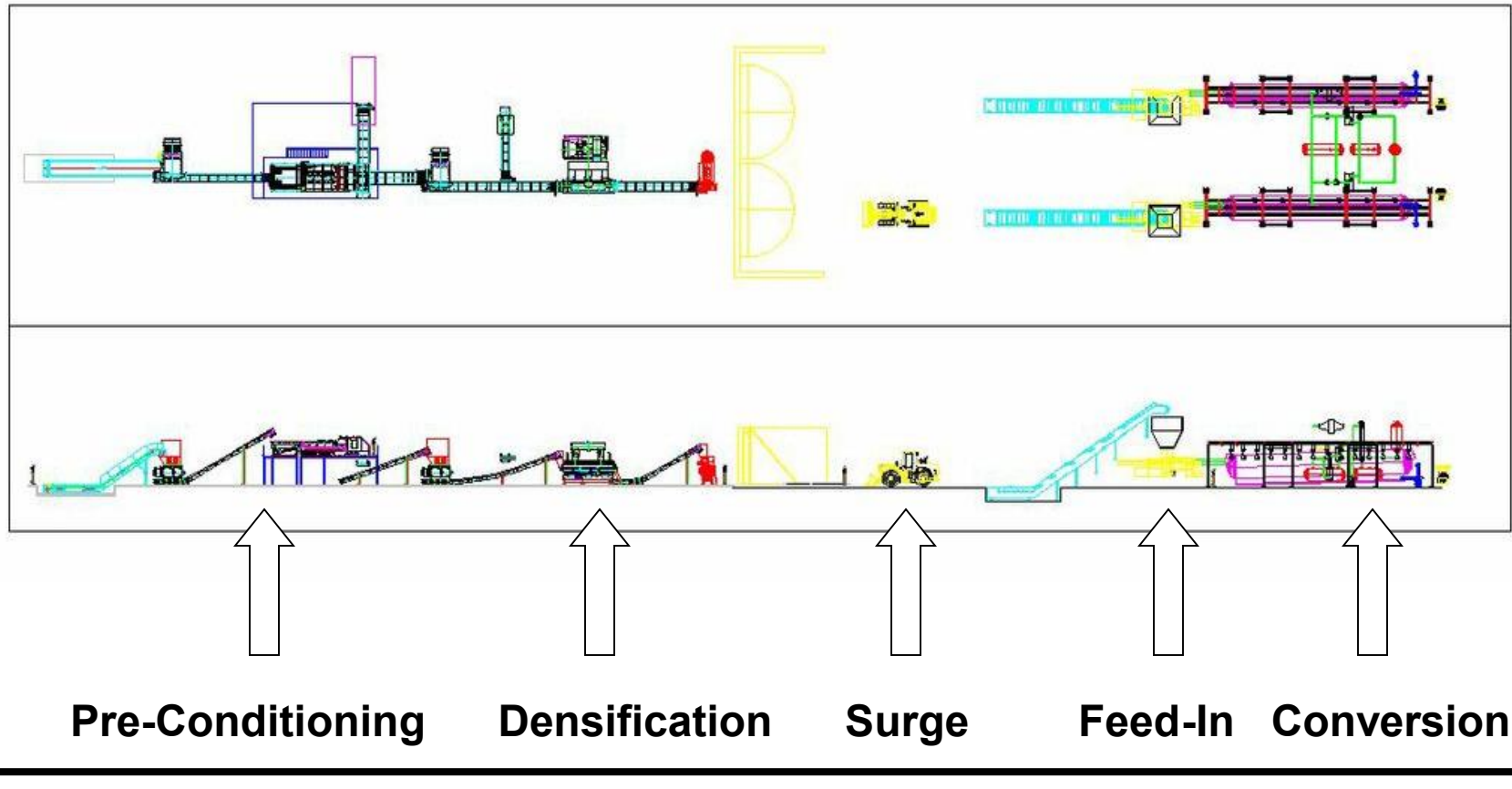


# *Conditions Are Optimal For Commercializing RES Polyflow's Innovative Technology*

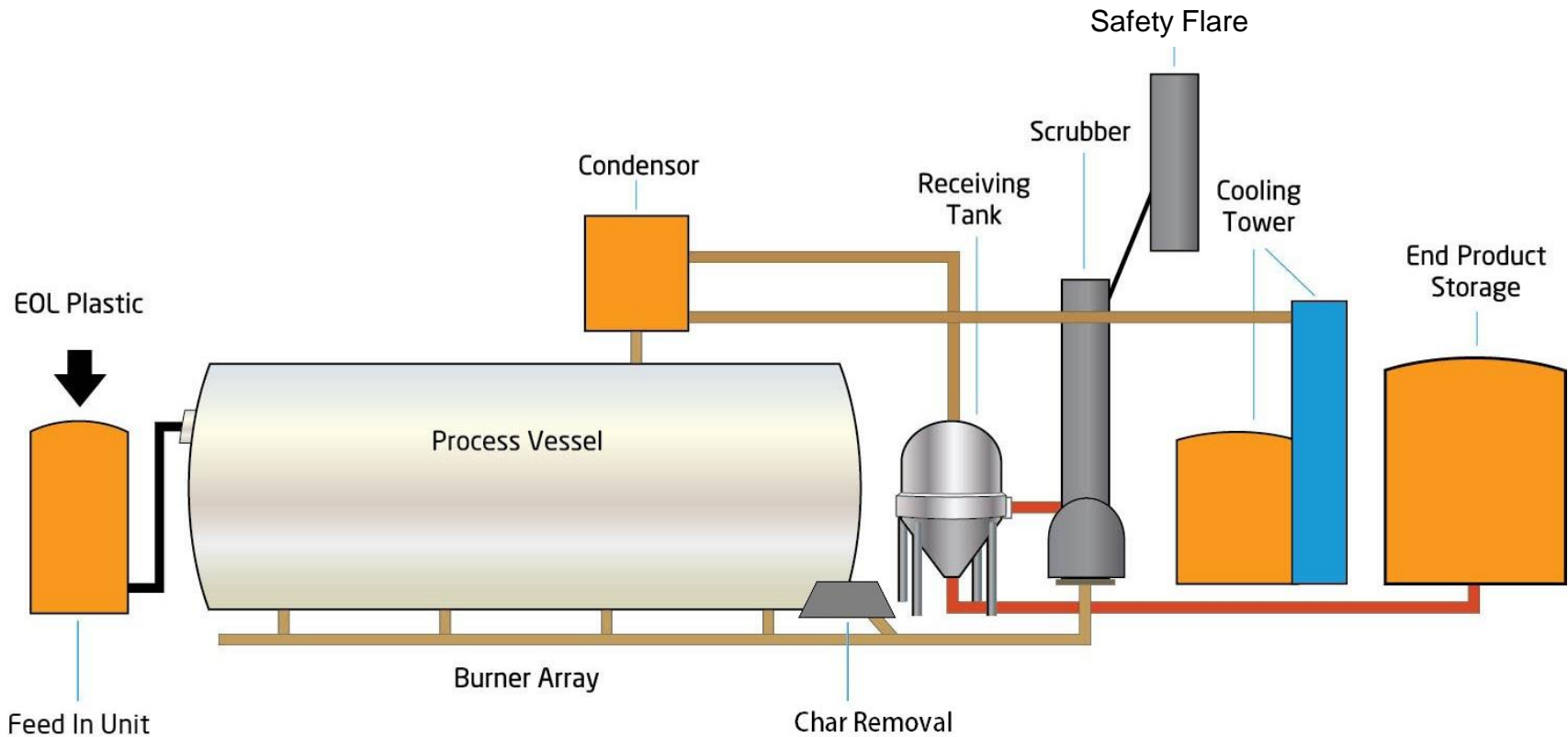


- Robust
- Feedstock Agnostic
- Profitable
- Continuous
- Scalable

# *End Of Life Plastic Is Continuously Fed @ 10/tph*



# *A Closed Vessel Cracks The Hydrocarbon Chains*



# *The Resulting Vapor Then Cools And Is Recovered As Liquid Hydrocarbon*



# *It's No Longer Theoretical*

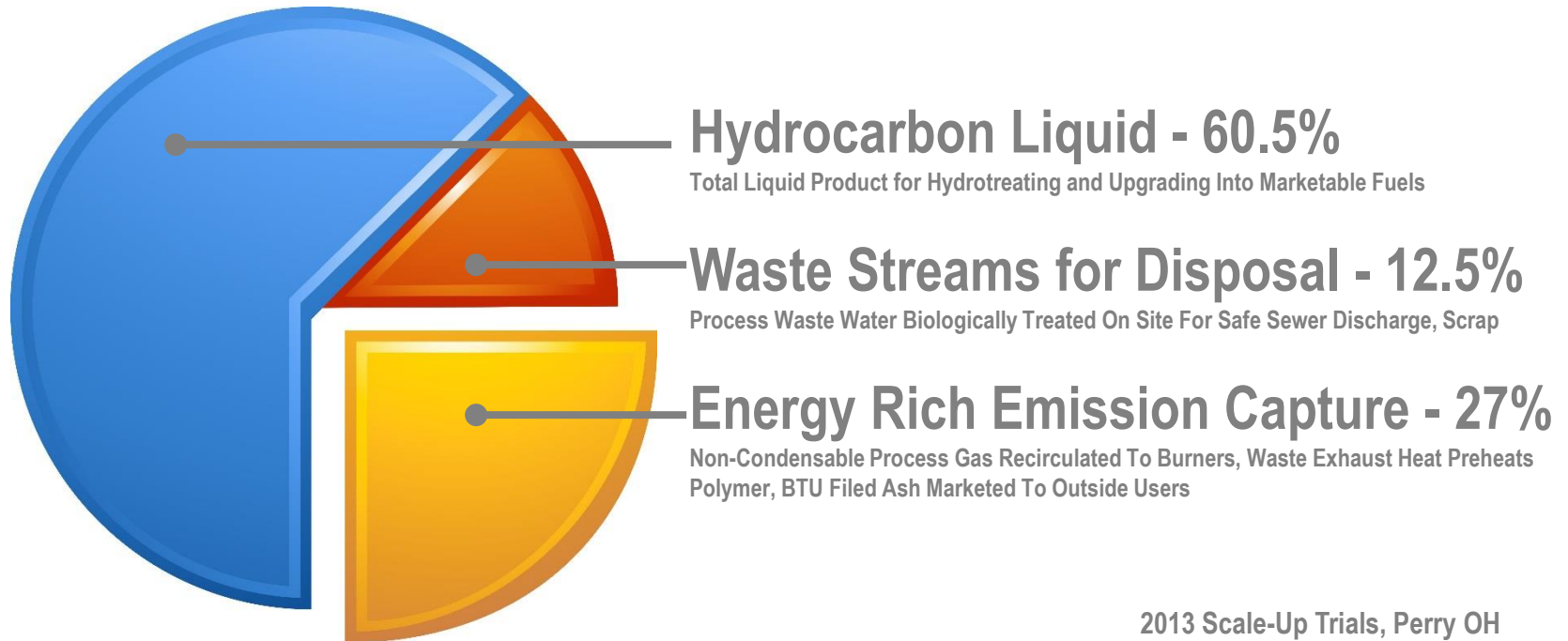


Full Scale Demonstrator Constructed and Started-Up in 2013, North Perry OH

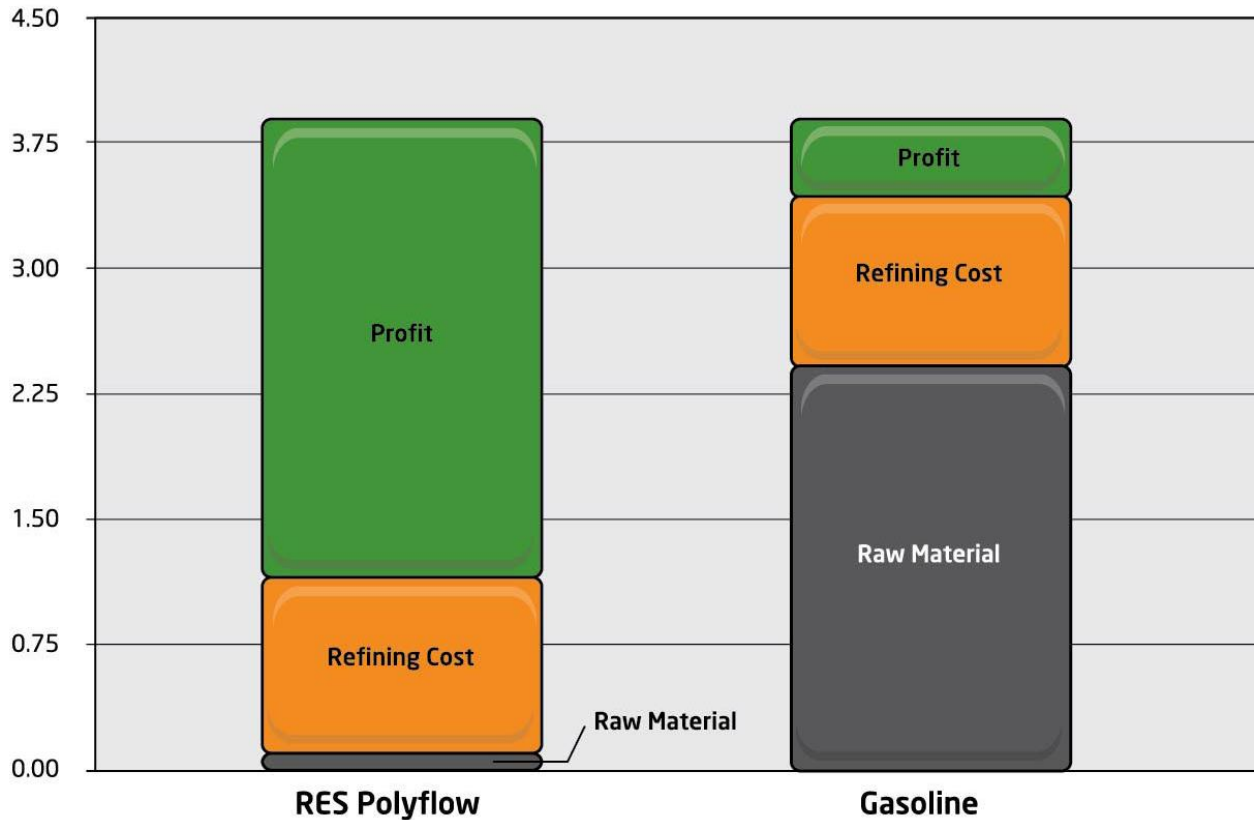
# *100 Barrels Of Fuel Produced From Just Two Truckloads of Plastic Waste*



# *Our Material Balance - A Full Accounting*

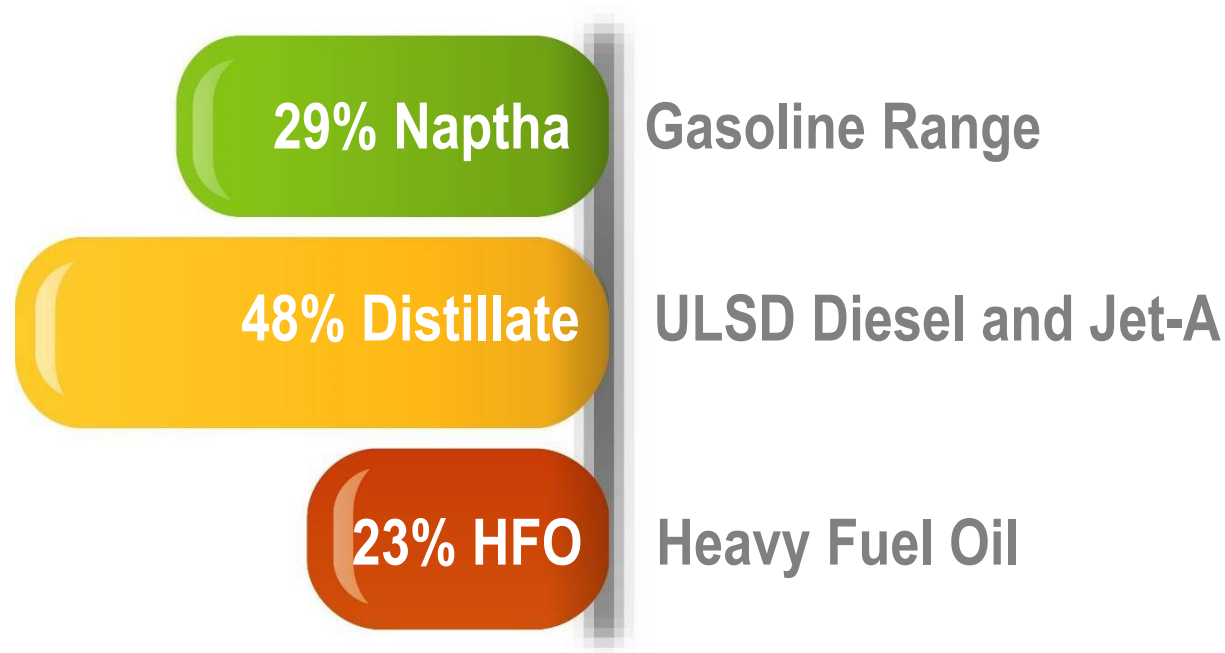


# Plastic To Oil - An Economic Advantage



RES Polyflow produces high value commodity materials from low cost raw materials

# *Three Marketable Fuel Streams Produced From Local Waste Sources*



Testing Source: Intertek Pilot Plant Services, April 2014

# Process and Equipment Patents In Place

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization  
International Bureau

(43) International Publication Date  
27 April 2006 (27.04.2006)

(10) International Publication Number  
WO 2006/043924 A1

(51) International Patent Classification: C10G 1/02, 1/10, C10B 47/18, 53/00

(21) International Application Number: PCT/US2004/033796

(22) International Filing Date: 13 October 2004 (13.10.2004)

(25) Filing Language: English

(26) Publication Language: English

(71) Applicant (for all designated States except US): CHAR-LIE HOLDING INTELLECTUAL PROPERTY, INC.; 50 South Pershing Avenue, Akron, OH 44313 (US).

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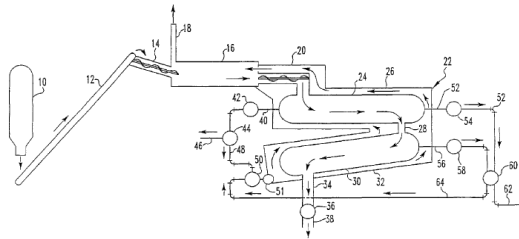
(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MY, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TD, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, UJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, NI, SN, TD, TG).

Published:  
— with international search report  
— with amended claims

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: PYROLYTIC PROCESS AND APPARATUS FOR PRODUCING ENHANCED AMOUNTS OF AROMATIC COMPOUNDS



(57) Abstract: Various embodiments of a process for pyrolyzing hydrocarbonaceous material are provided. In one embodiment the process for pyrolyzing hydrocarbonaceous material includes charging a reactor with a feed material comprising hydrocarbonaceous material, heating the feed material, and collecting liquid product from the reactor which is anaerobic in operation. At least 5 % of the organic carbon atoms which are not present in an aromatic ring of a compound of the feed material are present in an aromatic ring of a compound in a liquid portion of the product.

WO 2006/043924 A1

## Patents Allowed:

- ✓ Australia (2011)
- ✓ Canada (2012)
- ✓ European Union (2012)
- ✓ India (2014)
- ✓ Indonesia (2012)
- ✓ Mexico (2011)
- ✓ Taiwan (2012)
- ✓ United States (2008, 2011)

## Patents In Examination:

Brazil, China

# *Plastic To Oil Conversion Puts America To Work*



**Research and Development**  
**Facility Design and Construction**  
**Supply Chain Development**  
**Plant Operations**  
**Administration and Finance**  
**Quality Control and Compliance**  
**Training and Tech Support**

# *To Power Planes, Trains And Automobiles*



And Ships

And Trucks

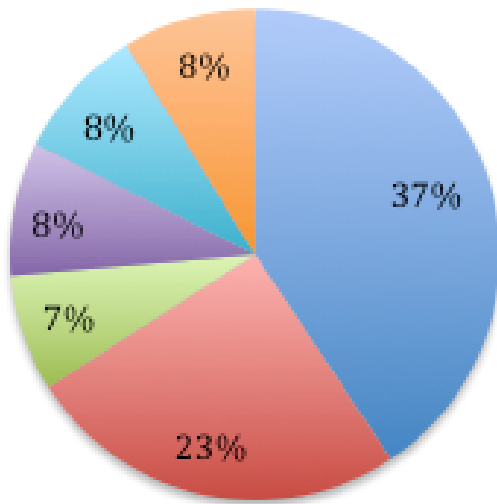
And Heavy Equipment

And Farm Tractors

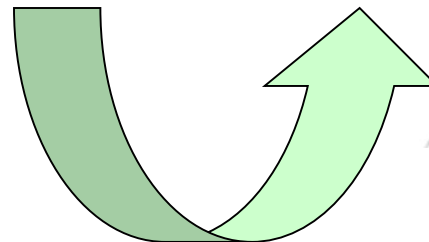
And Our Military

# Through Smarter Hydrocarbon Utilization

## Plastic Consumption



- packaging
- building
- agriculture
- transportation
- houseware
- electrical



# Thank You!

Michael Dungan  
Director of Sales and  
Marketing

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 @polyflow

