DRIP Committee

From: Regenerative Education Centers Non-Profit <info@recenters.org>
Sent: Monday, February 19, 2024 3:01 PM
To: DRIP Committee; Ellen B. McKinley; Angela R. Lucero; Shelly K. Espeleta; Tamara A. Paltin; Christi A. Keliikoa
Subject: Two of the Powerpoint presentations for 2/21 DRIP
Attachments: PDO Intro Deck - Lahaina 020124.pptx; OregonStatePTF_Lahaina_Feb2024.pptx

Good afternoon,

Please see attached documents for this week's DRIP presentation. To my knowledge everyone will be presenting remotely, however they are all looking forward to it and have a lot of practical expertise and are good people.

Will most likely send 2 more presentations tomorrow, but wanted to get these over on the sooner side.

Thank you,
Spencer

PDO Technologies

Providing a smarter end-of-life solution for waste plastics

PDO Technologies History

- *PDO grew out of Agilyx (founded by Kevin DeWhitt in 2004) when Agilyx shifted their focus away from mixed-waste plastic (MWP) after successfully developing the technology and deploying it into three commercial projects*
  - *The Agilyx technology approach, invented by Kevin DeWhitt, was successful, with product yields of >80% at an "Energy Returned on Energy Invested" (EROEI) ratio of over 4:1 using agricultural waste plastic feedstock*
  - *During DeWhitt's tenure at Agilyx, the company raised over $80 million in venture capital from premier venture capital firms, including Kleiner-Perkins, Chrysalix and Saffron Hill, and strategic investors, including Waste Management and Total Petroleum (now Total Energies)*
- *PDO is pursuing a more strategic approach to growth, ensuring access to localized sources of high-quality feedstock through a strategic partnership with Agriplas, development of additional feedstock verticals, and rigorous capex/opex controls*
  - *The PDO equipment design is an improvement over the previous technology schema, and can be used to produce two different product streams in service of two different marketplace verticals*
  - *PDO is also pursuing mobile feedstock collection and densification strategies with the goal of always finding (or generating) the "lowest level of economic aggregation" for waste plastic streams*

ALWAYS START WITH “WHY”

PDO Technologies - technology history part I

PDO Technologies - technology scalability

2.5 TPD

10 TPD

50 TPD

PDO Technologies “at a glance”

- ✓ *“Distributed infrastructure” model for plastics recycling, starting with the agriculture sector and agricultural waste plastics*
- ✓ *Proven pyrolysis technology converts waste plastic to usable, saleable products (petrochemical feedstocks (CPF) and/or fuels)*
- ✓ *Longstanding partnership with a premier northwest recycler, providing clean, consistent feedstock and labor*
- ✓ *Experienced, cohesive team*
- ✓ *Accepted by key end markets – Oil & Gas, Petrochemical and “retail” offroad fuel consumers*
- ✓ *Substantial upside through geographical and industry expansion*

PDO's Technology

Proven Technology

Process has been tested at the Brooks, Oregon plastic recycling facility, AgriPlas.

Proven Sales

Fuel produced has been sold to local users, CPF offtake agreements are being finalized.

80% Processing Yield

~ 8.1 lbs. of plastic waste

Creates approx. 1 gallon of fuel or CPF

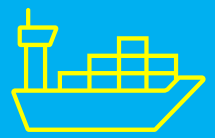
Two Product Lines

PDO Conversion

Plastic-to-product Technology

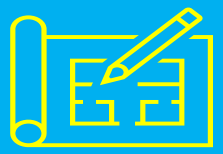
PDO Aggregation

Remote, real-time cleanup

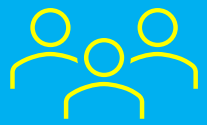


Shipped globally in 2 containers.

Or built locally.



Does not require specialized equipment to setup or operate.



Does not require a specialized team.

Scalable to meet local needs.

Returns 4-7 times the energy that is used.

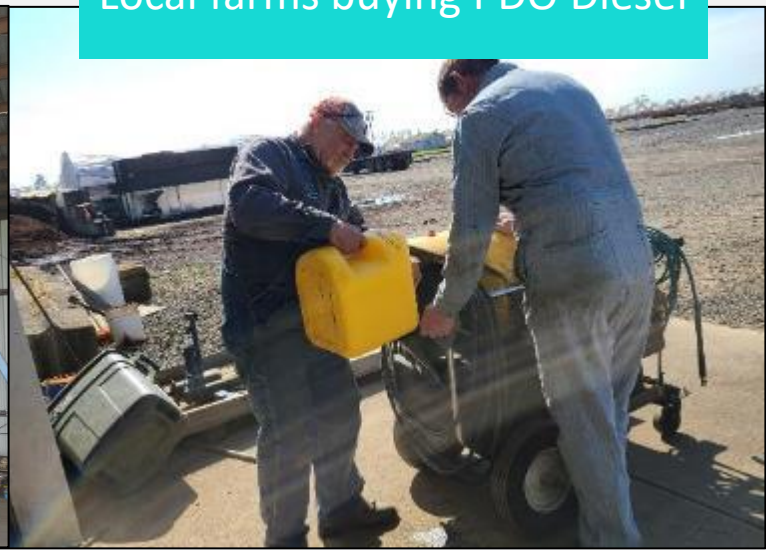
Creates a positive cashflow for operators.

15+ year technology lifespan.

25-year Plastic Recycler (AgriPlas) Brooks, OR

PDO Onsite at Agriplas: *New* Prototype with CDR

Local farms buying PDO Diesel



Traction: First *full-scale beta:* revenue generation

15-year proven, and tested Technology

Real sales of fuel into the local fuel marketplace

16 PDO technology units in inventory are 65% complete

4 active project customers in the pipeline

PDO – Leveraging 100+ Years of Industry Experience

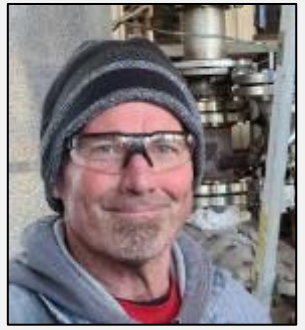
Kevin DeWhitt
Founder/CEO/CTO
Former Agilyx Founder 23+ years of plastic-conversion technology experience

Julie Ask
Admin/Project Mgmt.
Former Agilyx Senior Project Manager; 9+ years of experience & 3 project rollouts

Brent Bostwick
Business Development
Former Agilyx CCO with 3 commercial project transactions, 10+ years of experience

Bill McAtee
Plant Operations
Former Agilyx Ops Director; 13+ years of plastic-conversion technology experience

Asa Yunker
Engineering
B.S. Ch.E. (OSU '22) with 2 years of undergraduate research in small-scale pyrolysis technologies



Tom Sprague
Facility Manager
Former Agilyx Operations Manager; 11 years of plastic-conversion technology experience

Extended Advisors

Mike Bennett
Chemical Engineer
Former Agilyx Process Chemical Engineer (13 yrs)

Allen Jongsma
Plastic Recycler
30+ years of industry experience

Mark Fitz
Distribution
27+ years of fuel distribution experience

Vatea Herman
Finance
20+ years, Senior Partner, KPMG

Industry Partners

AIRTHERM CORPORATION
24 years in engineering

DYNAMIC PANEL SOLUTIONS CO
15 years in controls engr.

USMW U.S. METAL WORKS, INC.
15 years in manufacturing

EVERGREEN ENGINEERING, INC.
Engineering and Construction Services
12 years in engineering

PDO Technologies

Thank you

Contact:
kevin.dewhitt@pdotech.com

Futile to Utile:
Waste Plastic to Diesel Fuel in a Bench Scale Pyrolysis Reactor

Oregon State University Polymer Laboratory
Dr. Skip Rochefort (skip.rochefort@oregonstate.edu)

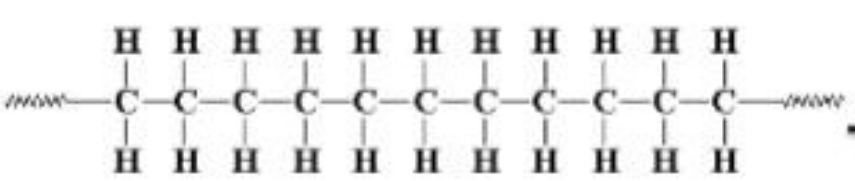
OSU PTF Team (all UG Students)
Eloise Thoreson (Project Lead), Jess Ralph, Stephen Ero, Abbie Marshall, Maia Mansour, Jacob Walsh, Grace Pettis, Uriel Perez, Kate Williams, Laura Osborne

Principal Investigators
Dr. Skip Rochefort, OSU CBEE
Dr. Lucas Ellis, OSU CBEE
Kevin DeWhitt, PDO Tech &AgriPlas (Brooks, OR)

Pyrolysis - Alternative to Traditional Recycling

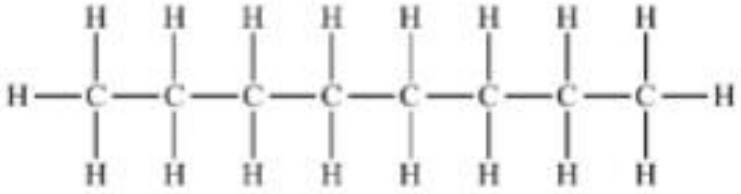
Oregon State University
College of Engineering

- Pyrolysis or chemical recycling is the thermal degradation in the absence of oxygen to depolymerize plastics to smaller chain carbon products
- Can be done with any plastic, except PET.



Polyethylene: A common polymer molecule

Pyrolysis



Octane: A volatile molecule found in diesel

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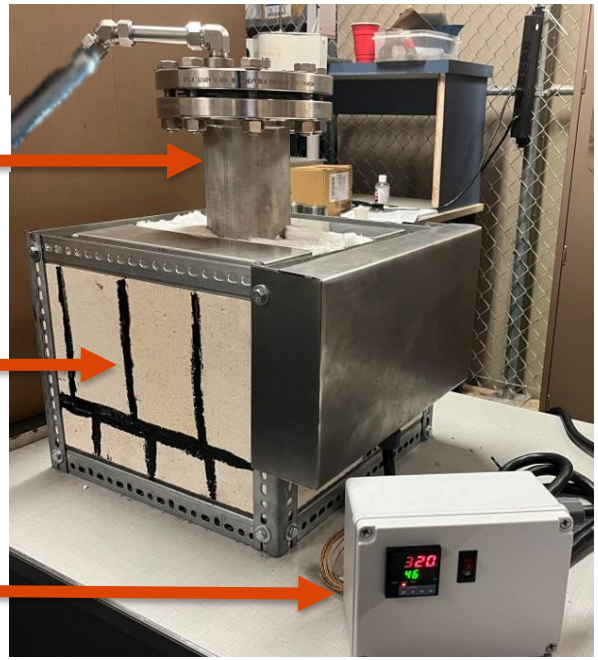
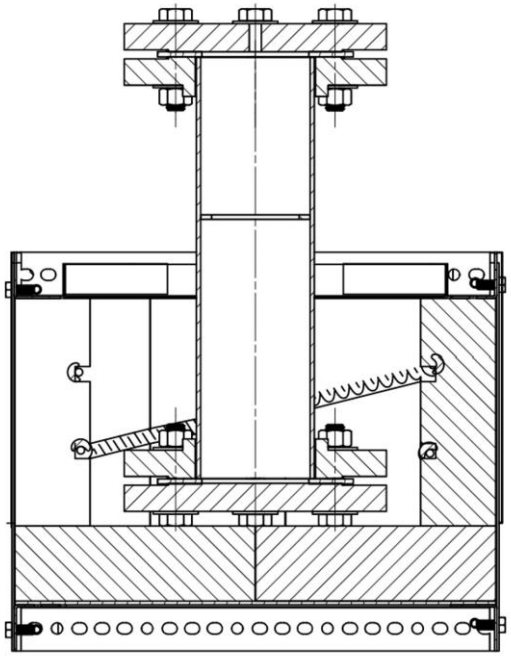
Modified Reactor Design

Pebbles **lower cost**

Kiln provides **balanced heating** and **removes exposed wires**

120V plug **increases accessibility**





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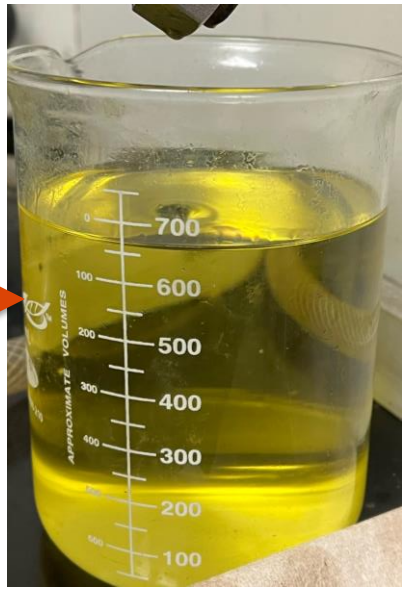
Processing the Samples

Plastic is collected

A wood chipper is used to shred the dirty plastic

Plastic is directly loaded into reactor and heated to 460℃



Pyrolyzed product will appear 2.5 hours after start

Total run time is 5-7 hours

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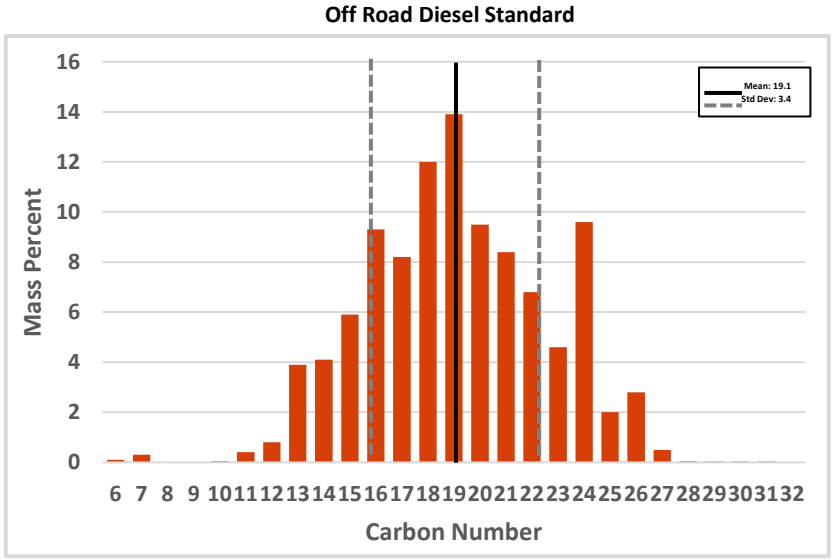
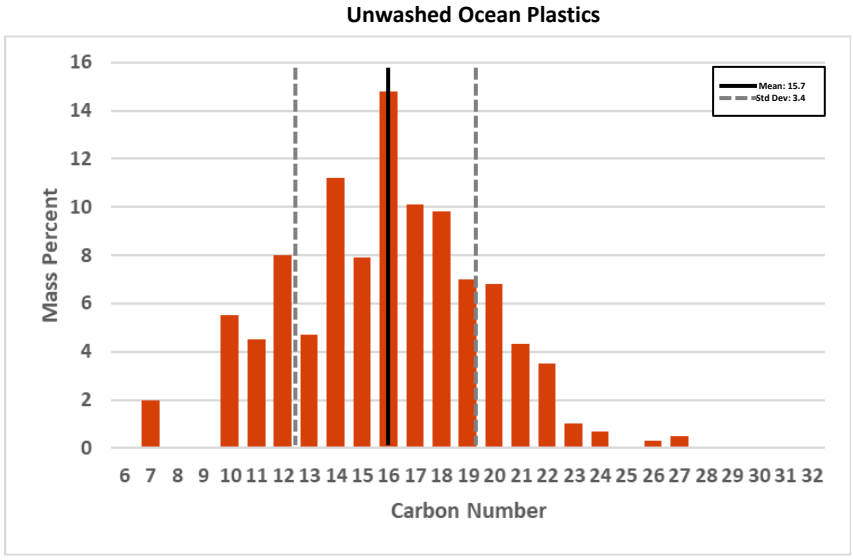
Gas Chromatography Analysis

Agilent Model 6890 Gas Chromatograph

- Mesitylene is used as an internal standard
- **Off road diesel has a median at C15-C19**





Collaborators

Dr. Lucas Ellis, Assistant Professor of Chemical Engineering, CBEE
Lucas.Ellis@oregonstate.edu

AgriPlas (Allen Jongsma, Brooks, OR) https://agriplasinc.com/
Agricultural Plastics Recycling

PDO Tech (Kevin DeWhitt, CEO, Brooks, OR) https://www.pdotech.com/
Commercial Scale PTF Reactors

Ocean Plastics Recovery Project https://oceanplasticsrecovery.com/
Scott Farling and Capt. Andy Schroder, Kodiak, AK
NOAA sponsored Ocean Plastics Recovery Trips and Education

Clean Oceans International (Capt. Jim (Homer) Holms, Santa Cruz, CA)
Pilot-Scale Project with PDO Tech https://www.cleanoceansinternational.org/