



HOW CAN WE SOLVE THE WORLD'S PLASTIC WASTE PROBLEM?

Aduro Energy: Enabling a fresh look into the treatments of waste hydrocarbons

One of the biggest industrial breakthroughs in human history was the birth of the modern plastics era: [The invention of synthetic plastic in 1907](#) – the first plastic to be derived not from plants or animals but from fossil fuels. After World War I, advances in chemical technology led to an explosion in new forms of plastics, with mass production beginning around World War II. Since then, the rate of plastic production has grown faster than that of any other material and the vast majority of it is produced from non-renewable resources such as oil and coal.

Synthetic plastics are a blessing and curse at the same time, revolutionizing life as we know it thanks to the advantage that they seemingly last forever – but that advantage is also a great disadvantage because [around 40%](#) of all plastic produced are used only once, then thrown away.

No organisms had evolved that are capable of digesting these alien materials. As such, plastics might pile up on this planet for hundreds of years without decomposing – so far society has managed to recycle [only 9%](#) of all the plastic we have produced – a statistic that is indicative of the major changes we need to make.

Since the 1950s, human beings have produced [over 8.3 billion tonnes](#) of plastic – around 60% of which has ended up in landfills and in our waters.

Plastics are affecting the health and wellbeing of water and earth creatures, including humans. Microplastics are tiny particles broken down by water, sunlight, wind, and waves – and can be found in nearly every corner of the world, including public water systems and the air we breathe. When animals ingest microplastics, BPA (bisphenol A) and other chemicals can find their way into our bodies as well, resulting in [physical damage](#).

While governments and organizations around the world have been fighting for a cleaner planet for decades, they need any help they can get. Among the biggest challenges facing the treatment of unsorted waste plastics is the difficulty to create economic treatment in today's market volatility. Aduro Energy offers a fresh look into the treatments of waste hydrocarbons.

Company Details



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Shares Issued & Outstanding: 23,078,001



▲Chart Canada (CSE)

CanadianSymbol (CSE): [DFT](#)
Current Price: \$0.07 CAD (HALTED)
Market Capitalization: \$1.6 Million CAD

German Symbol / WKN: Not Listed
US Symbol: Not Listed



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NEW TECHNOLOGY, NEW SOLUTIONS

Established in 2012, Aduro Energy Inc. is an Ontario-based private company. After many years of research and development, Aduro has developed technologies to upgrade renewable oils as well as waste plastics and rubber to higher value products – cheaply and quickly.

The company believes to be ready to enter the path to commercialization and thus intends to go public via the recently announced transaction proposal from Dimension Five Technologies Inc.

Aduro's hydrochemolytic platform is a revolutionary approach enabling the deconstruction of complex molecules into simpler ones by agency of water instead of being solely dependent on thermal energy to drive chemical reactions.

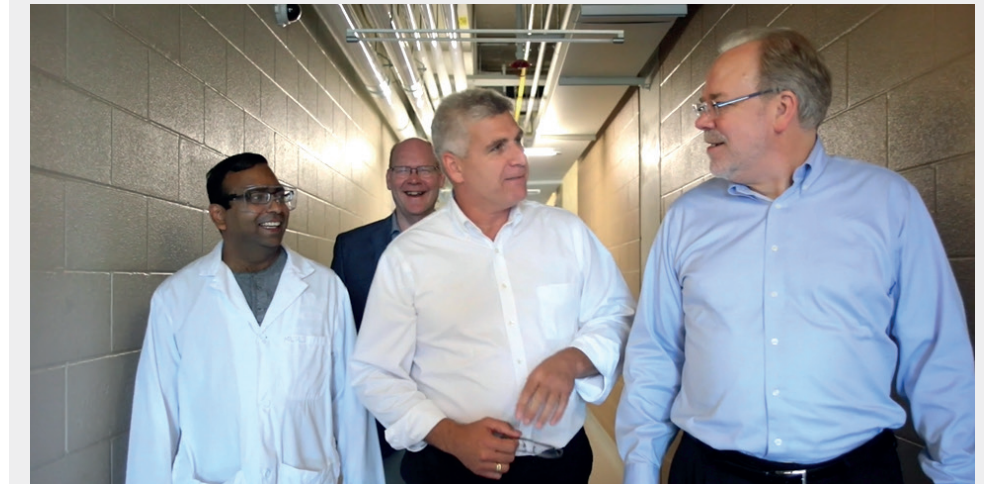
The process offers **industrial processing operations** which are economic already from small scale, with much less negative environmental impact, and which can be deployed at city centers as well as in remote and distant locations.

Aduro's unique clean technology transforms these feedstocks into higher value products such as fuels, bio jet fuels, light oils or advanced chemicals.

Originally conceived to radically enhance aspects of petroleum processing, the patented Aduro Energy solutions leverage unique properties of water to upgrade renewable oils as well as waste plastics and rubber to higher value products – cheaply and quickly.

The approach is significantly more environment-friendly than established alternatives like energy-intensive pyrolysis, gasification, and decades-old methods applied to petroleum.

Aduro Energy instead uses **hydrochemolytics [i.e. deconstruction of complex molecules into simpler ones by agency of water]**, a smart chemistry approach developed by the company. It bypasses traditional methods' reliance on high temperatures from 400°C to



Ofer Vicus, Founder and CEO – B.Eng Industrial Engineering and Executive EMBA from the Kellogg/Tel Aviv University. The passion behind Aduro to build a dedicated research & business team to meet goals.



Marcus Trygstad, Founder and CTO – A recognized international expert in the development and application of advanced strategies monitoring, controlling, and optimizing petrochemical processes. The technical vision behind Aduro and its intellectual property.



Dr. Anil Jhavar, Lead Technology Scientist, is Doctorate in Chemical and Biochemical Engineering from Western University. The Aduro technical superman who turns ideas into technical reality.



Abe Dyck, VP Business Development – A seasoned professional focused on the renewable sectors, his contribution to the company is priceless. Initiated and led Green Aviation Canada consortium. Aduro's translator, explaining our vision to the business community.

as high as 1100°C, and on hydrogen produced by conversion of natural gas at between 700°C and 1000°C. Although hydrochemolytics operates at only 260°C – 390°C, it achieves the same benefits by activating and tuning water to beneficially transform diverse feedstocks.



Aduro Energy has developed a highly versatile clean energy platform featuring 3 water-based technologies:

- **Hydrochemolytic Plastics Upgrading** ("HPU"; Upgrading End-of-Life Polymers)
- **Hydrochemolytic Renewables Upgrading** ("HRU"; Upgrading Renewable Oils to Renewable Diesel)
- **Hydrochemolytic Bitumen Upgrading** ("HBU"; Upgrading of Heavy Oil)

HPU: The Hydrochemolytic Plastics Upgrading technology was developed to address the mounting global problem of post-consumer plastics, foam, and rubber from used tires. These materials consist of large, durable molecules called polymers whose properties make them both useful to society and problematic to nature. Aduro Energy applies insights from its original work with petroleum to use HPU to disassemble polymers into smaller molecules, converting waste to resource. It does this through hydrochemolytics, a water-based green chemistry method that accomplishes in an hour what can take decades in nature. In some cases, the products can be purified and reused as feedstocks in the circular economy for producing new plastics or foams. Or, the polymer resource can instead be converted into hydrocarbon fuels. Either way, the application of HPU to recovered plastics, foams, and tire rubber serves to reduce the demand for crude oil while also diverting end-of-life and single-use waste materials from landfills and oceans.

HRU: The Hydrochemolytic Renewable Upgrading technology offers the possibility to transform renewable oils into renewable motor fuels, bio-jet fuel, and specialty chemicals. At the heart of this novel, patent-pending process is a highly scalable continuous-flow reactor that hydrochemolytically upgrades lipids regardless of fatty acid content. Feeds may include the inedible corn oil by-product from ethanol plants; oils from non-food seed crops grown on marginal lands; off-spec canola and soybean oils; tallow; and yellow and brown grease from restaurants that often flows into wastewater treatment



Replacing heat (as a medium) with water is a game-changing concept that enables selective control of chemical conversion by a process that is more akin to those applied in nature.



plants. The products obtained may also be diverse: besides renewable fuels, the core conversion technology can be configured to produce renewable specialty chemicals such as vegan saturated fatty acids for personal hygiene and industrial applications. HRU also presents a pathway to renewable resins for coatings, adhesives, sealants, and foams for seat cushions or mattresses, replacing raw materials traditionally derived from petroleum.

HBU: The Hydrochemolytic Bitumen Upgrading technology is a completely new approach for transforming heavy

crude oil and bitumen into lighter crude. Covered by four patents and patents pending, HBU takes direct aim at asphaltenes and related "heavy" components in petroleum. Their presence at levels up to 25% in Alberta bitumen make it extremely dense and viscous, precluding transport by pipeline unless modified by traditional approaches. By applying hydrochemolytics, HBU efficiently deconstructs the heavy components into lighter molecules, some even being in the diesel range. The upgraded crude has superior properties compared with Western Canadian Select (WCS),



including reduced values for sulfur, metals, and acid number. Reduced viscosity means it can be transported through pipelines without dilution by light hydrocarbons. Compared with alternative upgrading technologies, the additional benefits of reduced emissions and low resource demands of HBU gives environmental and competitive advantages to Alberta producers of heavy oil and bitumen.

TIME TO GO PUBLIC

According to Dimension Five's [news-release](#) of July 14, 2020:

Dimension Five Technologies Inc. (CSE:DFT) ("D5" or the "Company") is pleased to announce that it has entered into a binding letter of intent (the "LOI") with Aduro Energy Inc. ("Aduro" or "Aduro Energy") to acquire 100% of the issued and outstanding shares of Aduro from the shareholders of Aduro (the "Transaction").

The Transaction

a. The Transaction is to be a share exchange or three-cornered amalgamation pursuant to which D5 will purchase all of the Aduro Shares from the Aduro Shareholders, and the Aduro Convertible Notes from their holders, in exchange for an aggregate of 40,000,000 D5 Shares and 80,000,000 Special Warrants. The Special Warrants will automatically convert on a one for one basis into D5 common shares upon the achievement of certain milestones in the development of the Aduro business.

The Parties are to negotiate the Definitive Agreement and to use all commercially reasonable efforts to complete ancillary agreements, apply for and obtain CSE approval of the Transaction, and, in particular, take the following steps:

- (i) as soon as is reasonably practicable, D5 will apply to the CSE for the consent to complete the Transaction described in the Letter of Intent;
- (ii) as soon as is reasonably practicable, D5 will complete a financing of at least



Heavy crude oil has a notorious reputation of being high in emissions and having a low market value in comparison to conventional crude oil. Heavy crude oil is not only poor in quality, but it also requires a lot of energy to extract and treat. Once Aduro's rapid upgrading process is complete, the crude oil is worth much more, while capturing almost all emissions.



The simplicity of the idea is that Aduro can "activate" water, and make water do something that it normally would not do. Aduro started off contemplating how to upgrade heavy oil and found out that through a combination of different chemical tweaks to the system, Aduro can apply hydrochemolytic upgrading to all kinds of oils and also convert rubber and plastics into high-value fuels and specialty chemicals.



A rubber tire crushed into powder (left) is converted into a diesel-like product (right). (All images courtesy of Aduro Energy Inc.)

\$500,000, a portion of which will be lent to Aduro prior to Closing to assist Aduro in its ongoing business development;

- (iii) before or contemporaneous with Closing, Aduro will ensure that all Aduro options, Aduro Warrants any other rights to acquire Aduro Shares (other than the Aduro Convertible Notes) are converted or exercised, so that no rights to acquire

Aduro Shares exist as at the Closing;

- (iv) before or contemporaneous with Closing, Aduro will ensure that all Aduro Convertible Notes have been amended such that such notes will automatically be exchanged for a portion of the 80,000,000 Special Warrants on achievement of the first milestone described in the Letter of Intent; and



(iv) at the Closing Date, nominees of Aduro will be appointed as 4 of the 5 directors of D5, the publicly listed parent company of Aduro, and D5 will change its name to "Aduro Energy Inc."

The \$500,000 financing mentioned above will be comprised of D5 shares to be issued at \$0.05 per share and a substantial portion is intended to close within the next 30 days. Subscribers must acknowledge that \$150,000 of the funds raised will be lent to Aduro prior to closing of the Transaction with limited security, to be repaid within one year only if the first milestone is not achieved. Subscribers in this \$0.05 financing will have to acknowledge that there is no assurance the Transaction will be completed.

Additional Information

The LOI regarding the proposed Transaction and the Resulting Entity will be filed on SEDAR and will be available for viewing by all shareholders. If completed, the Transaction will constitute a "Fundamental Change" pursuant to CSE policies. The LOI incorporates the principal terms of the Transaction described herein, and in addition, such other terms and provisions of a more detailed structure and nature as the parties have agreed.

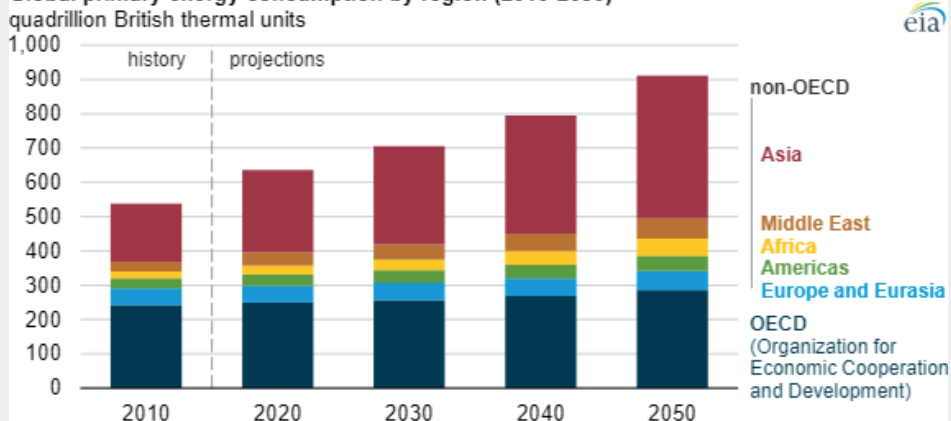
However, there is no guarantee that the Transaction will close. And if it does close, the Resulting Entity will have to qualify to list its shares for trading on the CSE under a Listing Application or similar disclosure document.

Trading Halt

Under CSE rules, trading in the Company's shares will remain halted until the Company either closes the Transaction or terminates the LOI.

(Not for dissemination in the United States of America)

Global primary energy consumption by region (2010-2050)



The Industry: The annual global market for the production and wholesale pricing of ethanol and biodiesel was sized at over 136 billion US dollars. By 2024, the market is expected to grow to almost 154 billion U.S. dollars. Market growth is projected to be driven by capacity additions and higher prices for alternative fuels. ([Source](#)) The U.S. Energy Information Administration (EIA) projects that world energy consumption will grow by nearly 50% between 2018 and 2050. Most of this growth comes from countries that are not in the Organization for Economic Cooperation and Development (OECD), and this growth is focused in regions where strong economic growth is driving demand, particularly in Asia. (Above chart from www.eia.gov)



Meet the Aduro Energy Team! We would like to invite you to attend an online video conference with Aduro Energy to learn more about the company and the team, and answer any questions about Dimension Five's recent news announcement and the proposed transaction. Ofer Vicus (CEO) and Marc Trygstad (CTO) will talk about what makes Aduro's technology unique and explain the market potential by providing novel cleantech solutions while shifting from fossil fuels into sustainable energy sources.

Date: **Wednesday 22nd July 2020**

Time: **9:00 AM PDT / 12:00 PM EDT / 6:00 PM CEST**

One click you're in! On Wednesday, click on the link below (if prompted enter the Meeting ID: 885 2963 8639 and Meeting Password: 595165):
<https://us02web.zoom.us/j/88529638639?pwd=SkFGWIRpT3dEandVeXNPU29KbDczZz09>

RSVP to Michael at mpatience@zimtu.com if you wish to attend. If you have a specific question you would like to be addressed by the Aduro Energy team you can send it to Michael.



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Stephan Bogner studied Economics, with specialization in Finance & Asset Management, Production & Operations, and Entrepreneurship & International Law, at the

International School of Management (Dortmund, Germany), the European Business School (London, UK) and the University of Queensland (Brisbane, Australia). Under Prof. Dr. Hans J. Bocker, Stephan completed his diploma thesis ("Gold In A Macroeconomic Context With Special Consideration Of The Price Formation Process") in 2002. A year later, he marketed and translated into German Ferdinand Lips' bestseller "Gold Wars". After working in Dubai's commodity markets for 5 years, he now lives in Switzerland and is the CEO of [Elementum International AG](http://ElementumInternationalAG) specialized in the storage of gold and silver bullion in a high-security vaulting facility within the St. Gotthard Mountain in central Switzerland.

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