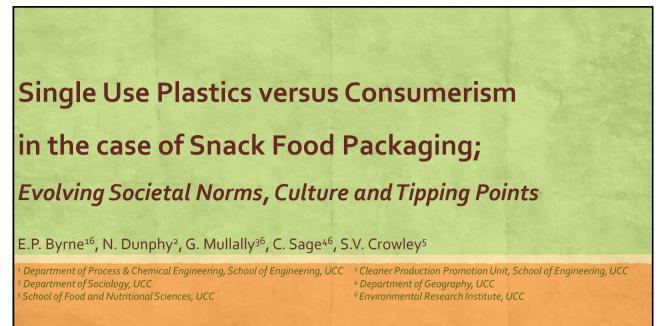


Title	Single use plastics versus consumerism in the case of snack food packaging; evolving societal norms, culture and tipping points
Authors	Byrne, Edmond P.;Dunphy, Niall P.;Mullally, Gerard;Sage, Colin;Crowley, Shane V.
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University College Cork, Ireland Coláiste na hOllscoile Corcaigh



UCC University College Cork, Ireland Colliste na hOllscoile Corraich

International Sustainable Production and Consumption 4-5 October 2018, Manchester, United Kingdom Edmond Byrne BE MSc PhD MA(TLHE) CEng FIChemE MIEI Professor of Process & Chemical Engineering, University College Cork, Ireland

# **Plastics Tipping Point**



#### Plastic pollution – what was the tipping point? 20/06/2018 Share: G f V @ @+



DR PHIL ALDOUS Director of Water, Thomson Ecology

Despite years of research, news stories concerning plastics and the pollution of the marine and water environment have finally started making headlines, Dr Phil Aldous writes. Why the sudden change? Returning to the trigger that made us all sit up and listen. Was it the BBC's 'Blue Planet II' – and Sir David Attenborough's words, "the future of all Ife now depends on us" – that was the trigger for action, and why is that more powerful than 50 years of published research? Maybe because it is citizen power that can be really emotive and, if spoken by a non-politician, is seen as more trustworthy. We do need to reduce our plastic pollution in seas and waterways and clean up our act. All of industry has a role to play in this – whether that is manufacturer or user.

Plastic waste pollution in the ocean: technology at the tipping point

ished Tuesday, May 22, 2018

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# TIPPING POINT ON PLASTIC - HOW ARE FRANCHISES COPING?

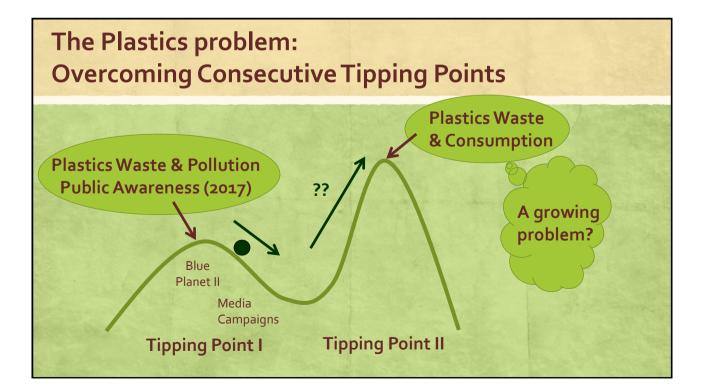


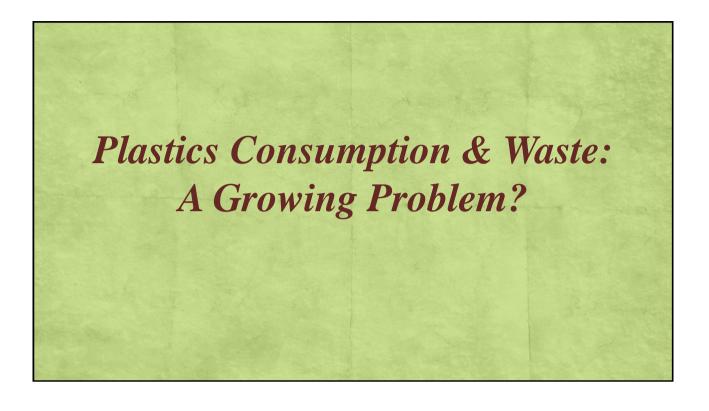
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# Plastics Consumption & Waste: A Growing Problem?

EET ENGINEERING

Plastic waste pollution in the ocean: technology at the tipping point

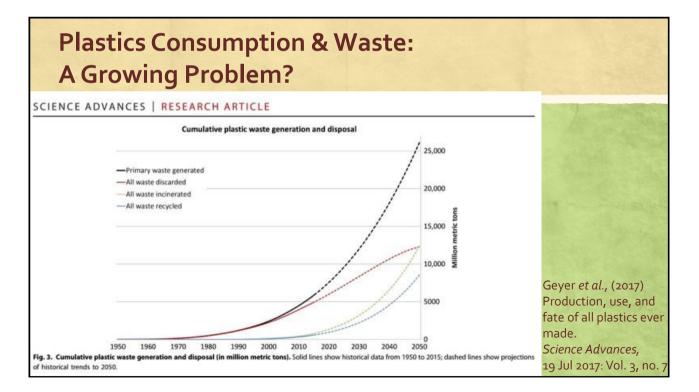
"A **whale** found washed up on a beach in Spain earlier this year had **29kg of large pieces of plastic** in its digestive system – including rubbish bags, ropes, pieces of net and a drum.

In 2015, an international research team led by Erik van Sebille at Imperial College London estimated that between **15 and 51 trillion plastic particles** are floating in the world's oceans. Their combined weight is between **93,000 and 236,000 tonnes**.

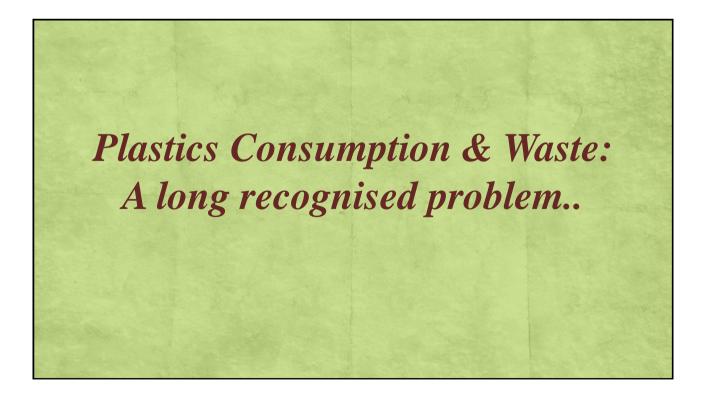
Each year, between **1.2 and 2.4 million tonnes** of plastic enters the oceans from **rivers**, according to a paper published last year in Nature Communications by Laurent Lebreton of The Ocean Cleanup (TOC) and colleagues. They calculated that two-thirds of this comes from just **20 rivers, mostly in Asia**."

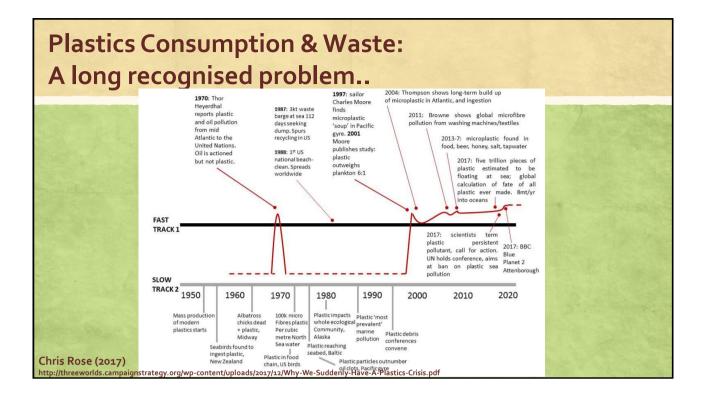
The Institution of Engineering & Technology (2018) https://eandt.theiet.org/content/articles/2018/05/plastic-waste-pollution-in-the-ocean-technology-at-the-tipping-point/











# Plastics Consumption & Waste: A long recognised problem..



EDUCATION tce

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# Plastics Consumption & Waste: A long recognised problem..



Contents lists available at ScienceDirect
Education for Chemical Engineers

Chem

journal homepage: www.elsevier.com/locate/ece

Chemical engineering in an unsustainable world: Obligations and opportunities

Edmond P. Byrne\*, John J. Fitzpatrick

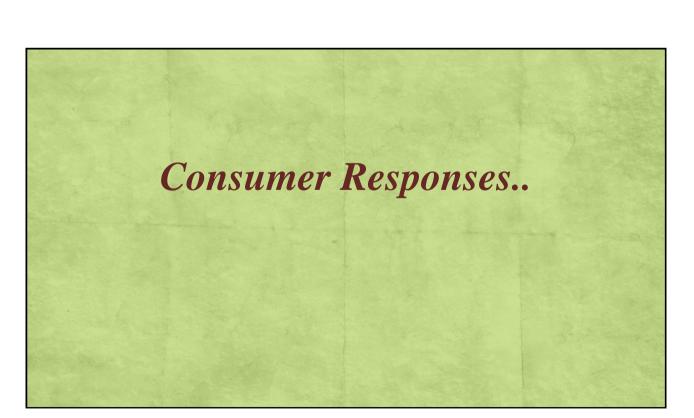
Department of Process & Oriential Engineering, University College Cark, Ireland "Plastics companies who hire chemical engineers who see their role as merely "paid hands" to produce plastics more efficiently may find themselves without a market over time, and the chemical engineer they hired without a job. Chemical engineers who join plastic manufacturers, and who see their role as one which produces a product which meets a required specification for a given function, may help lead their organisation to continued success through innovation and new product lines." Byrne & Fitzpatrick (2009) Educating the chemical engineer of the future

Sustainability needs to quickly become the context for 21st century chemical engineering education, argues Edmond Byrne

entury promises will flourish on En mankind with an expressed through ed confluence of abound regarding II emanating from an etal construct. These would be hard pre-

#### The Chemical Engineer (tce) (Issue 833, 27-29) Nov 2010

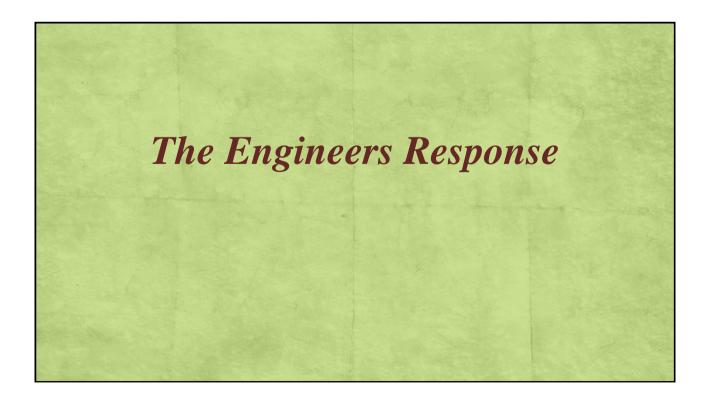
the design team, such as: "Are there materials, and corresponding processes, other than MVC/PVC that can take their place, that are sustainable, or at least, less unsustainable?" Could for example, lactic acid, and the resultant biodegradable plastic polymeric lactic acid (PLA) take the place of PVC for many applications? Or "In general, how feasible is it to produce plastics from renewable materials as opposed to oil?" "What are the technical and economic barriers preventing for example, the production of biodegradable polymeric materials to met the required specifications?"











# **The Engineers Response**

- There's huge Media and Consumer hype.
- ..and **ignorance**: e.g. carbon emissions from ground down recycled glass greater than that of single use plastics.
- Yet, we need to **do something**/seek acceptable consumer solutions.
- It used to be the product that was centre of attention, now it's the packaging!





Follow

# **Industry Responses**





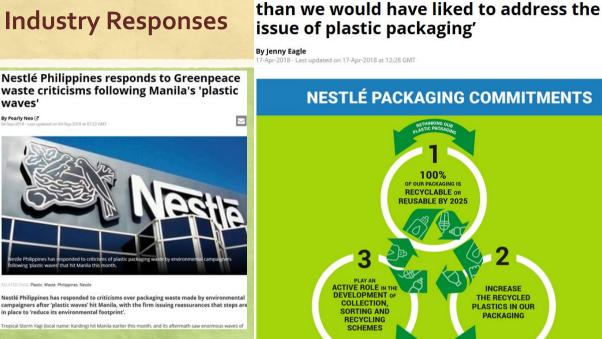
From @walkers\_crisps "We have received some returned packets and recognise the efforts being made to bring the issue of packaging waste to our attention. "The returned packets will be used in our research..." #packetinwalkers

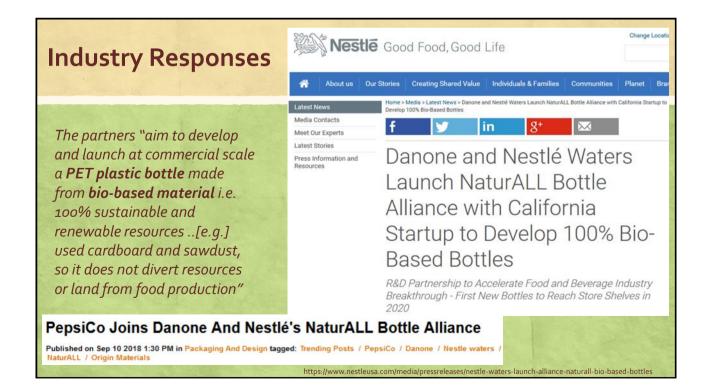


Walkers reveals what they will do with returned crisps packets People are sending the packets back to the company in the post leicestermercury.co.uk

8:15 am - 25 Sep 2018







Nestlé: 'It has taken us a little more time

# Plastic: changing it up

If we are going to benefit from new materials, clear labelling will be essential. Bio-PET, for instance, is a plastic made from renewable feedstocks like the leftover pulp from harvesting sugarcane. Coca Cola's bio-PET Plant bottle is made like this, but bio-PET behaves like oil-based PET (used for plastic bottles) and is recyclable, but not compostable.

There may yet be hope for biodegradable PET following the discovery of an enzyme dubbed 'PETase', produced by a bacterium called Ideonella sakaiensis 201-F6 that was found in the soil of a Japanese PET bottle recycling plant. Researchers at the US Department of Energy's National Renewable Energy Laboratory (NREL) and University of Portsmouth announced recently they had developed a faster working variant of the enzyme this year that can break down PET bottles more quickly.

#### The Institution of Engineering & Technology (2018)

https://eandt.theiet.org/content/articles/2018/05/plastic-waste-pollution-in-the-ocean-technology-at-the-tipping-point/



"A Tetra Pak package has a thin layer of polymer, or plastic, to prevent moisture getting in or out and to keep contents fresh. ..Our **long-term ambition** is for all our chilled and ambient packages to be made from **renewable alternatives to oil-based plastics**.

..Despite considerable progress, **bio-based polymers** are still **only in a small fraction of our cartons** and a **niche product** for the plastics industry.

..We are working with a number of our stakeholder partners to explore these issues, while also continuing to assess alternatives like other **plant -based materials, organic waste** and **algae**.



https://assets.tetrapak.com/static/documents/sustainability/2017-sustainability-report.pdf

# **Industry Responses**

"Performing as regular plastic is not so simple. ..TIPA's solution is a blend of **bio-based polymers** and derived from **plant-based** sources, which is not an easy technological feat."

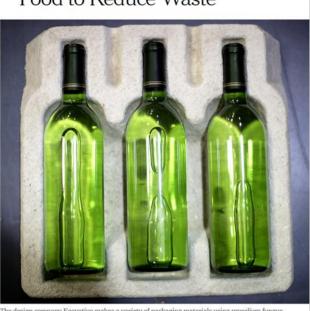


## Packaging Food With Food to Reduce Waste



https://www.nytimes.com/2017/05/30/dini ng/packaging-materials-food-waste.html

"Molded packing material by Ecovative made from a mushroom-type fungus."



The design company Ecovative makes a variety of packaging materials using mycelium fungus



No packaging options but.. students need to purchase microchipped bottles in order to dispense. Students To Trial Smart Coca-Cola Dispensers To Reduce Drinks Packaging

Posted on 9 October 2017 by Darrel Moore

Coca-Cola European Partners (CCEP) has launched a new initiative in partnersh ip with the University of Reading that will see students trial Coca-Cola Freestyle machines.

The programme combines a new generation of smart Coca-Cola fountain dispensers – known as Coca-Cola Freestyle machines – with refillable containers that are micro-



chipped to interact with the dispenser technology, allowing students and staff to buy all their soft









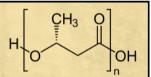








# The Pepsi Challenge

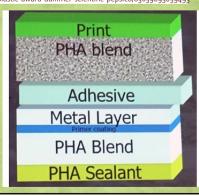


# Compostable snacks packaging snags bioplastic award for Danimer Scientific, PepsiCo

by: Rick Lingle in Packaging, Sustainability, Materials on September 18, 2018 https://www.plasticstoday.com/packaging/compostable-snacks-packaging-snaqs-bioplastic-award-danimer-scientific-pepsico/83659095059493

The industrial compostable snack bag is comparable in feel, noise and performance to PepsiCo's current bags and certified to be industrially compostable by TUV Austria. The new Danimer resins that are blends of biopolymers and mineral filler give the bag its white exterior and can be processed in blown film lines for improved economics. The new bio-based structures are currently being piloted in a limited test in the U.S. and Chile, with plans for a test in India later this year.

Polyhydroxyalkanoates (PHAs): polyesters produced by microorganisms, including via bacterial fermentation of sugars/lipids. They are used to produce biodegradable plastics.

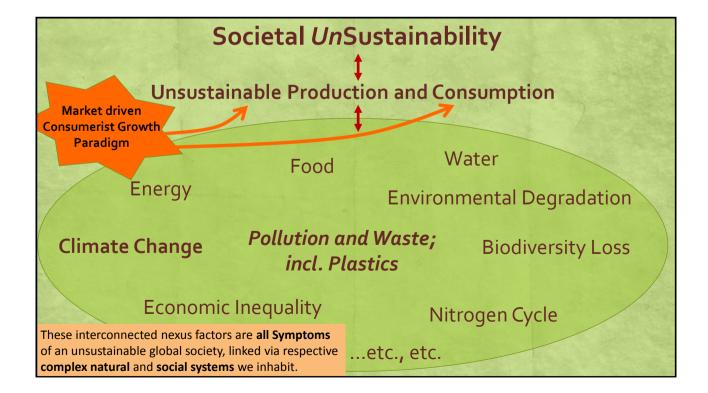


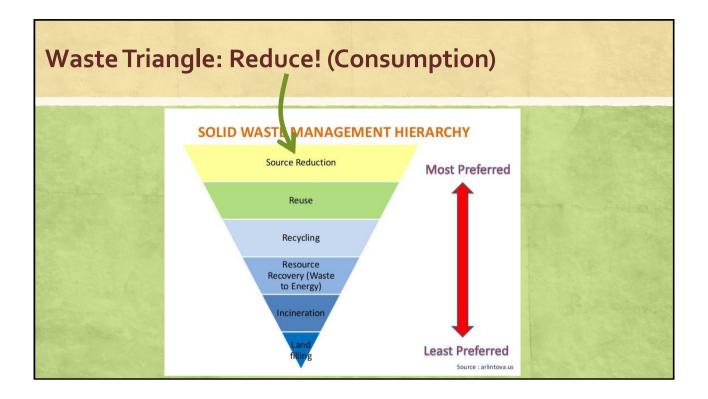
# **Problematizing Responses..**

Are proposed 'solutions' (including recyclable, bioplastic, biodegradable or no packaging options) more sustainable?

..Or in the context of the dominant societal paradigm of consumerist growth will they ultimately just contribute to creating

more waste, carbon emissions & environmental degradation?





# <text><text><text><text>

# The problem with Biodegradable Plastics.. European Parliament says biodegradable plastics will not solve plastic pollution

13 09 2018

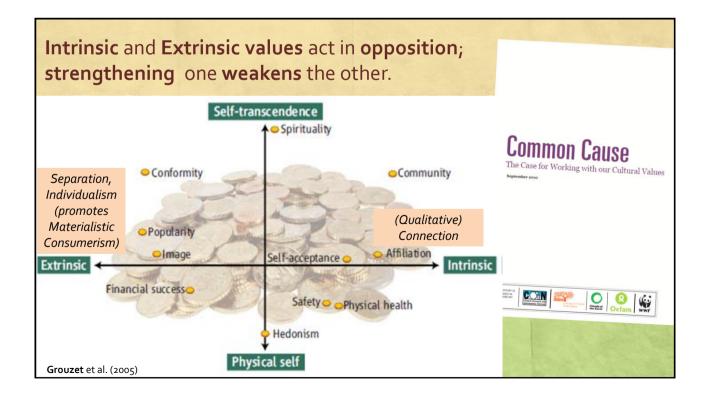
animals. The Parliament today has acknowledged that biodegradable plastics are not a silver bullet to our plastic pollution crisis, but merely a distraction from real solutions. Policies that dramatically cut our plastic footprint need to be urgently implemented."

The Parliament voted to strengthen the European Commission's plans to slash plastic pollution, under the European Strategy for Plastics in a Circular Economy launched in January 2018.

FOR IMMEDIATE RELEASE: Strasbourg, 13/9/2018 https://rethinkplasticalliance.eu/news/european-parliament-says-biodegradable-plastics-will-not-solve-plastic-pollution/







# **Demonstrating Conflicting Values?**

A careful evaluation of the narratives used in our everyday lives as consumers reveal that the package of narratives used are **collectively contradictory**.

In the context of ethical and environmental narratives, ..we purchase **water-intensive Fairtrade organic fruit and vegetables** that are **imported huge distances** by air transport from countries prone to **drough**t."

P. Haynes (2015) , Consuming Sustainability Narratives, in *Advances in Consumer Research*, 43, 364-367.

# How to move to Sustainable Consumption?

"Much of what we consume remains fueled by status competition and the **quest for social recognition** and acceptance: this suggests that in order to make progress in **curbing excessive consumption** and its impacts on **sustainability**, we may need to **reconceive consumption** not merely as a matter of **individual choice** but as one of **social norms** that is tied in with broader efforts to achieve **social justice**.

-If social norms are such a big driver of consumption, how can these norms be made to evolve?

-How can **technological** change be **reoriented** around **sustainability**, instead of the never-ending quest for economic efficiency, increased labor productivity, and profit maximization for technology owners?

-How can **markets be reshaped** in order to favor the shift to more **sustainable consumption** patterns, sometimes referred to as **voluntary simplicity"?** Olivier de Scl



Olivier de Schutter, UN Special Rapporteur 2008-2014

# Douglas Holt (2012): Another way towards **Sustainable Consumption?**

- Extremely difficult/will take too long to dislodge the Dominant Consumerist **Market Paradigm**
- But, its not necessary; Use marketing tools to change behaviour (and elicit sustainable consumption tipping point), as with introduction of plastic bottled water from the 1980s, which was not down to drinks companies, but due to:
  - Fears over tap water safety following high profile incidents
  - 1988 NY Times article suggesting experts recommend people drink 8 glasses water/day to remain hydrated
  - 1990/2000s narratives around obesity and sugary drinks

D. Holt (2012) Annals of the American Academy of Political and Social Science, Vol. 644, pp. 236-255

# **Popularising & Embedding Sustainable Consumption?**



#### CONSUMER

### Supermarkets join free water campaign

#### By Tom Bawden

Morrisons, John Lewis and Heathrow Airport are offering free drinking water after joining a nationwide campaign to reduce

a nation whe campagn to reduce plastic waste. Anyone with a reusable cup can fill it in over the counter at the supermarket chains' cafés, while dozens of fountains will be dotted around the west London airport.

They join Greggs, Costa, Starbucks and other outlets which have set up more than 12,000 water refilling stations across the country since the campaign kicked off in January. The Drinking Water Refill initiative is baing co.ordinated H

initiative is being co-ordinated by industry association Water UK. It has commissioned research showing that 85 per cent of the British population is worried about plastic waste.

## Find water on the go

Free Refill Stations on a street near you.

Get the App

30 100