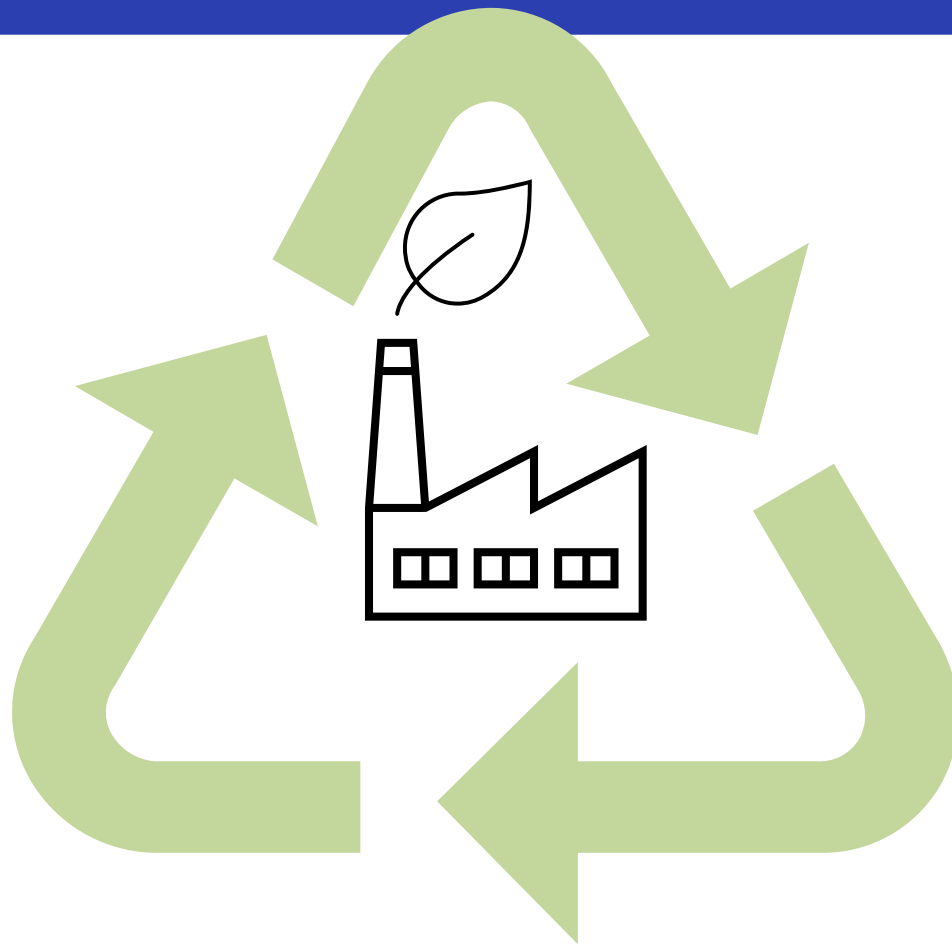


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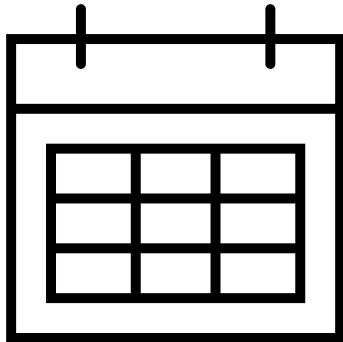
Faculdade
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de Lisboa

Eng Energy & Environment



Biorefinery

Professor: Carla Silva (camsilva@ciencias.ulisboa.pt)



Wednesdays

16h-19h30

Room: 8.2.13



Professor: Carla Silva (camsilva@ciencias.ulisboa.pt)

4 challenges!

Oral evaluation: discussing the challenges



IEA Bioenergy Task 42 “Biorefineries”

IEA Bioenergy
Technology Collaboration Programme

“Biorefining is the sustainable processing of biomass into a spectrum of marketable products and energy”.

2007



The biorefinery concept: Using biomass instead of oil for producing energy and chemicals, *Energy Conversion and Management*, Volume 51, Issue 7, 2010, Pages 1412-1421, ISSN 0196-8904, <https://doi.org/10.1016/j.enconman.2010.01.015>



Francesco Cherubini

Professor, Director of the Industrial Ecology Programme

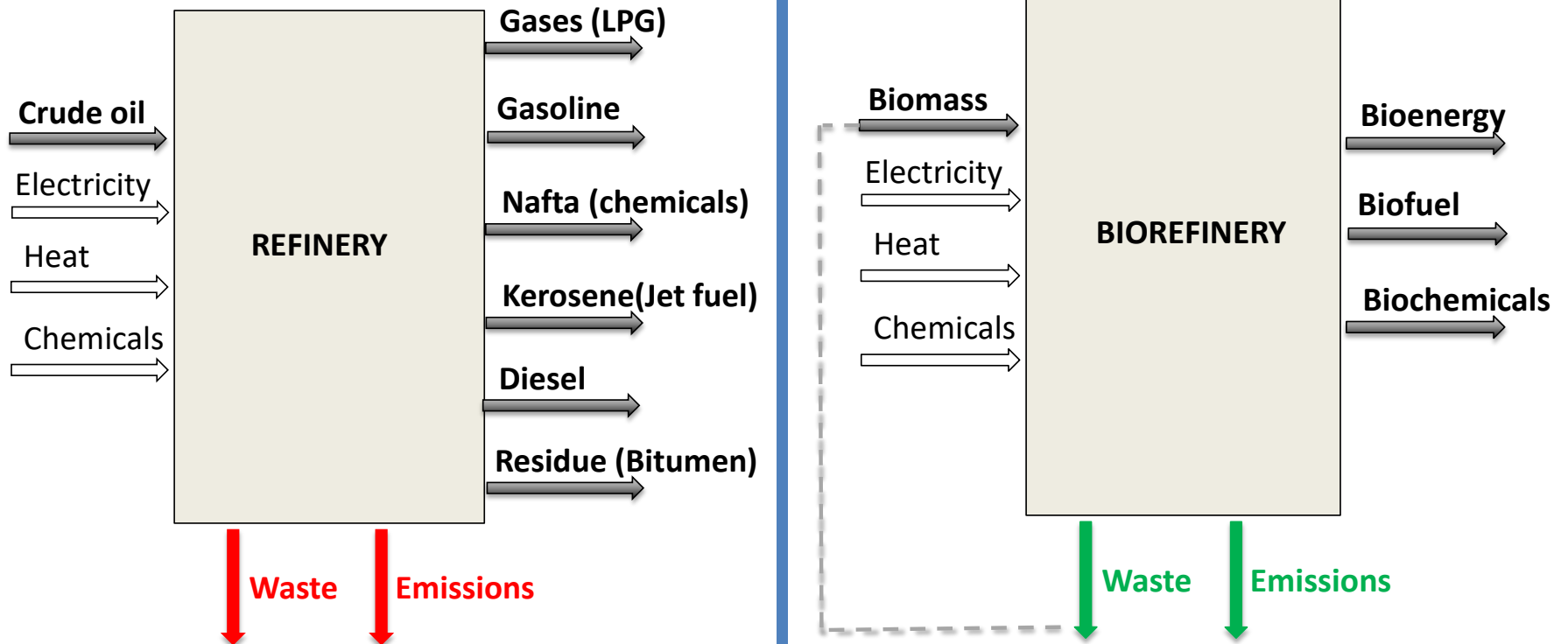
Department of Energy and Process Engineering

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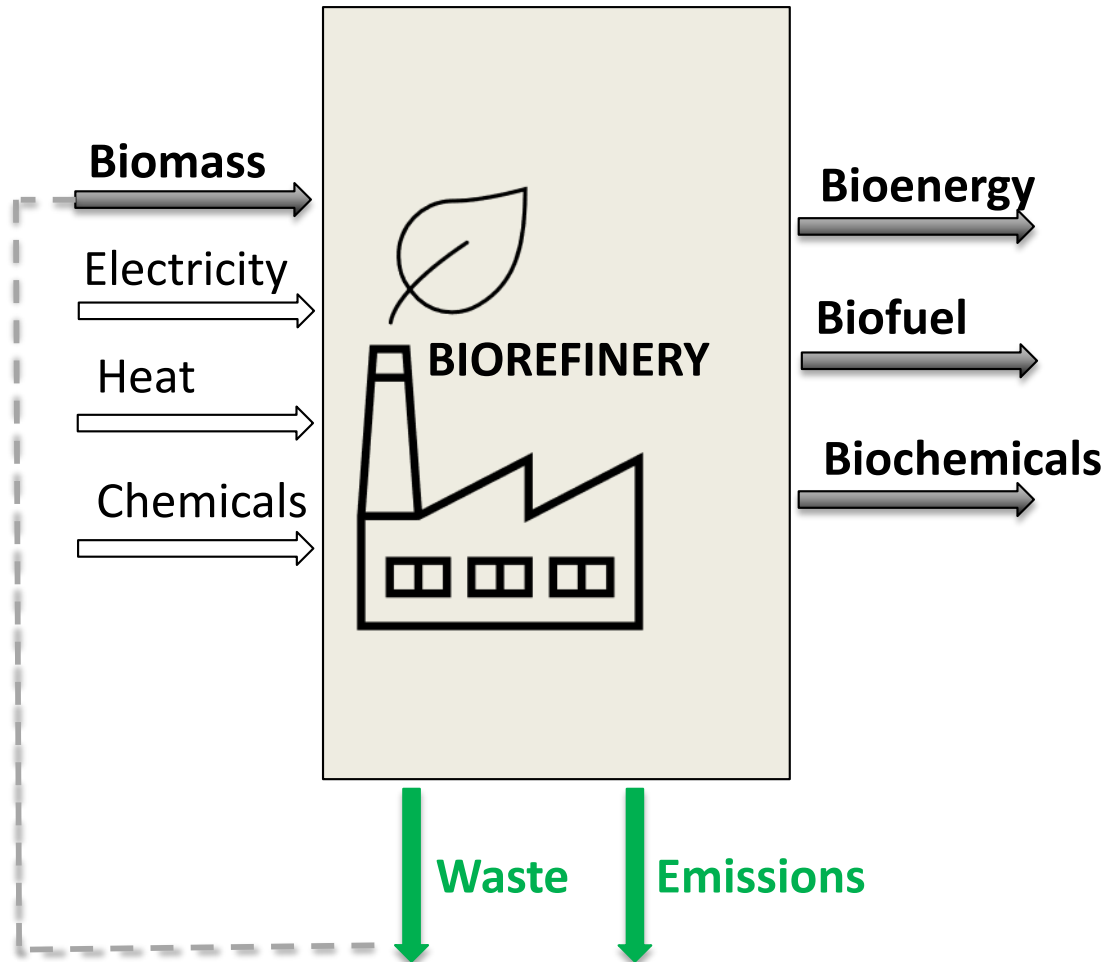




Collect and pre-treat:

Decompose biomass in:

Build products:





Glossary: Biomass



Biomass is organic, non-fossil material of biological origin (plants and animals) used as a raw material for production of **biofuels**. It can be also called biomass feedstock or energy crops. It includes wide range of materials harvested from nature or biological portion of waste. The most typical example is wood (firewood, wood residues, wood waste, tree branches, stump, wood pellets, ...), which is the largest biomass energy source. Other examples of biomass are grass, bamboo, corn, sugarcane, animal waste, sewage sludge and algae. Using biomass as a fuel is deemed carbon neutral as carbon was trapped from the atmosphere during the biomass life cycle (its grow). There are several sustainability concerns related to the use of biomass as fuel.

-
- **If the concept is just biomass came from dead living organism than a fossil fuel would be a biomass.....**
 - BioMass is a feedstock that is typically formed by dead organisms and is formed within a short life cycle as opposed to FossilMass that take million years to reborn
 - Waste that is formed in a short-term basis, e.g., wastewater, solid urban waste, industry waste can be categorized as a biomass.

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Volume 14, 15 May 2023, 100476



Waste tires based biorefinery for biofuels and value-added materials production

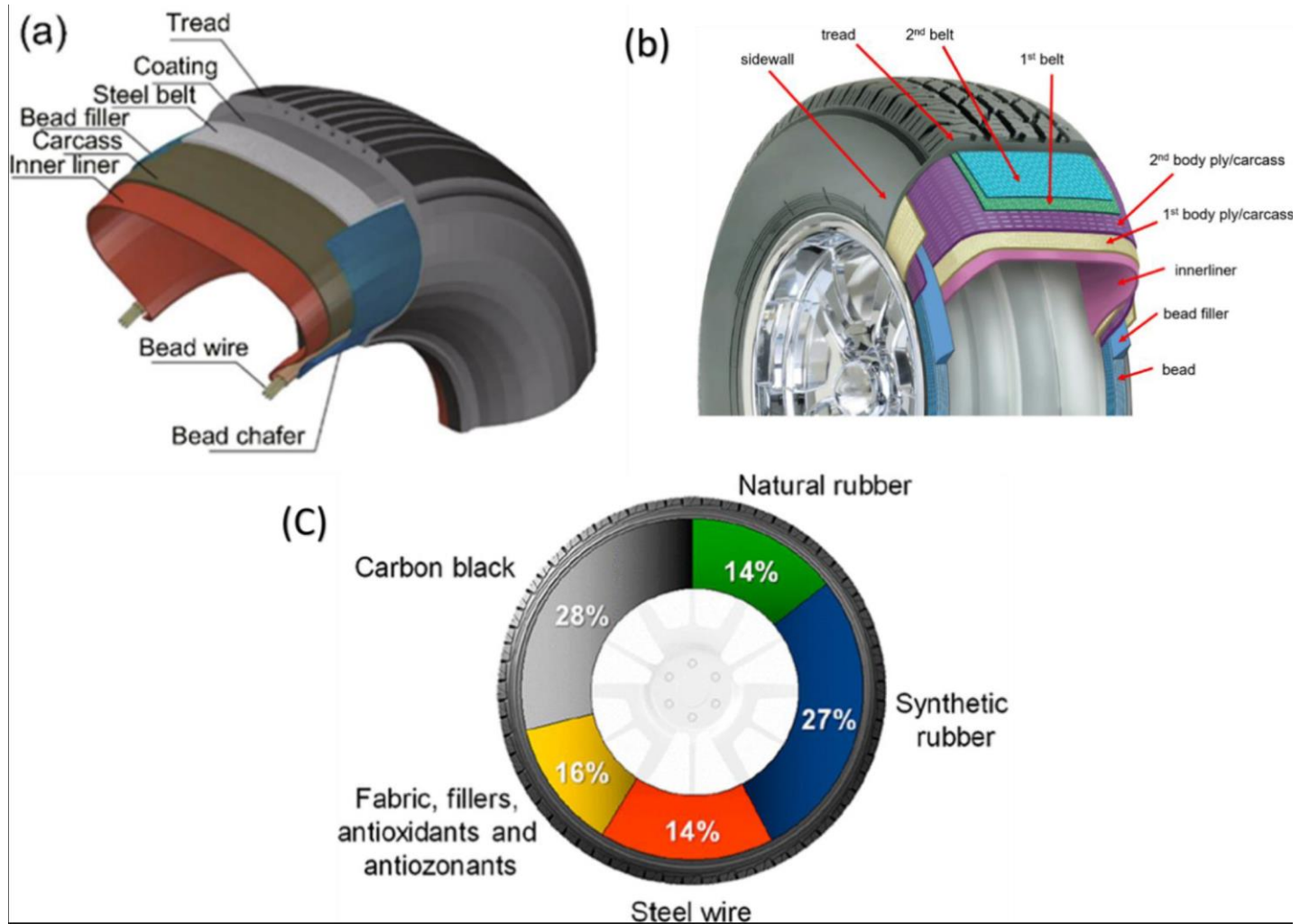
[Brooke E. Rogachuk](#)^a, [Jude A. Okolie](#)^b

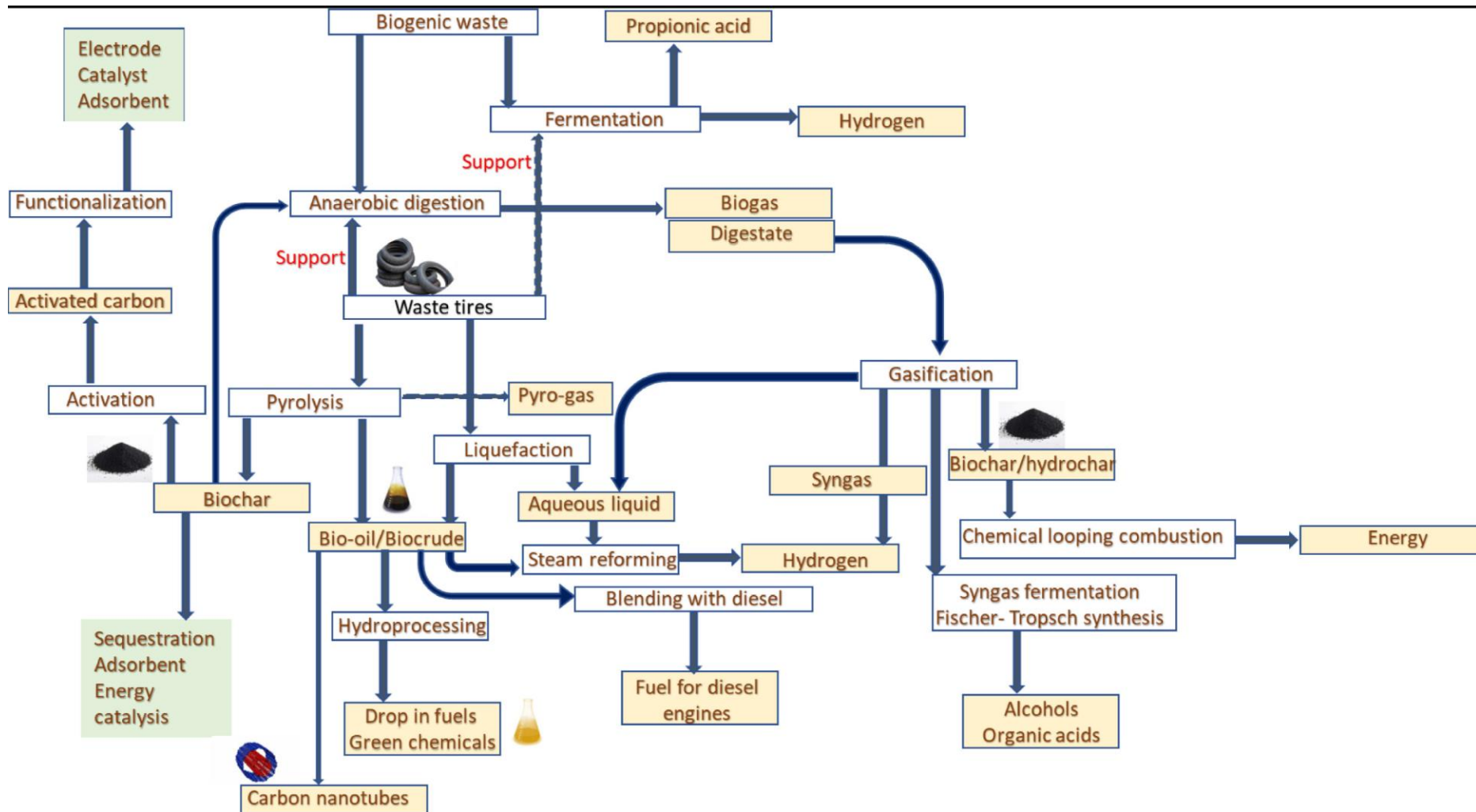
^a School of Aerospace and Mechanical Engineering, Gallogly College of Engineering, University of Oklahoma, Norman, OK, United States

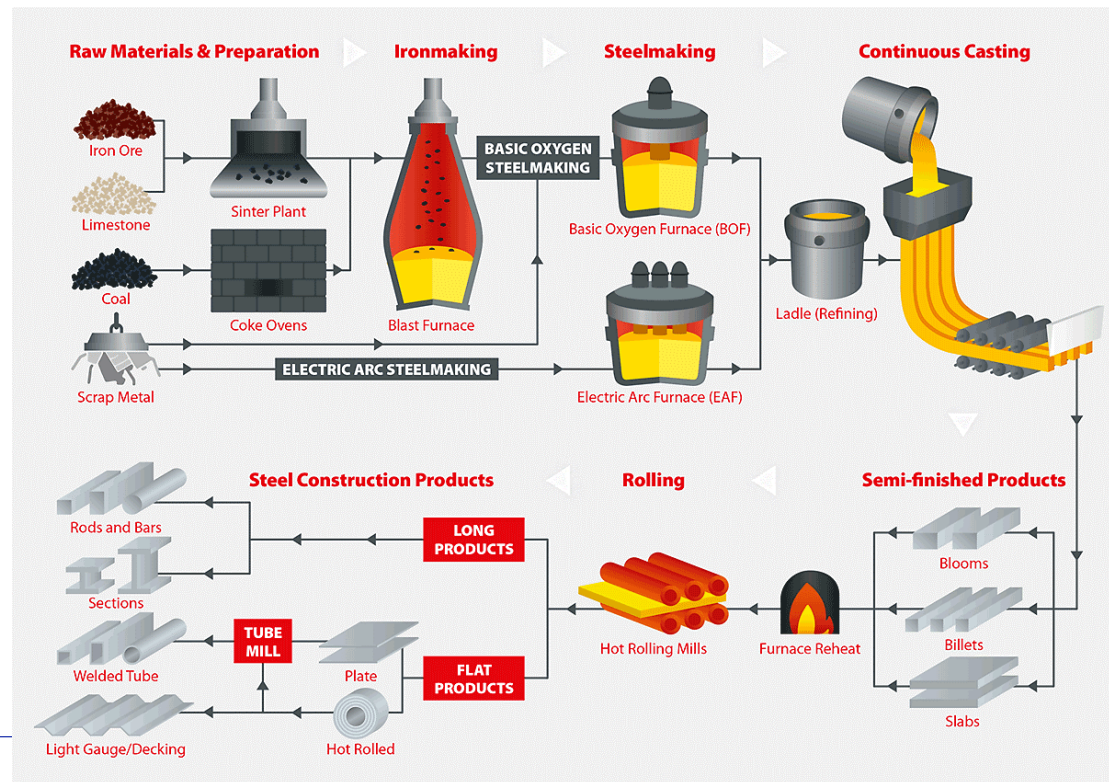
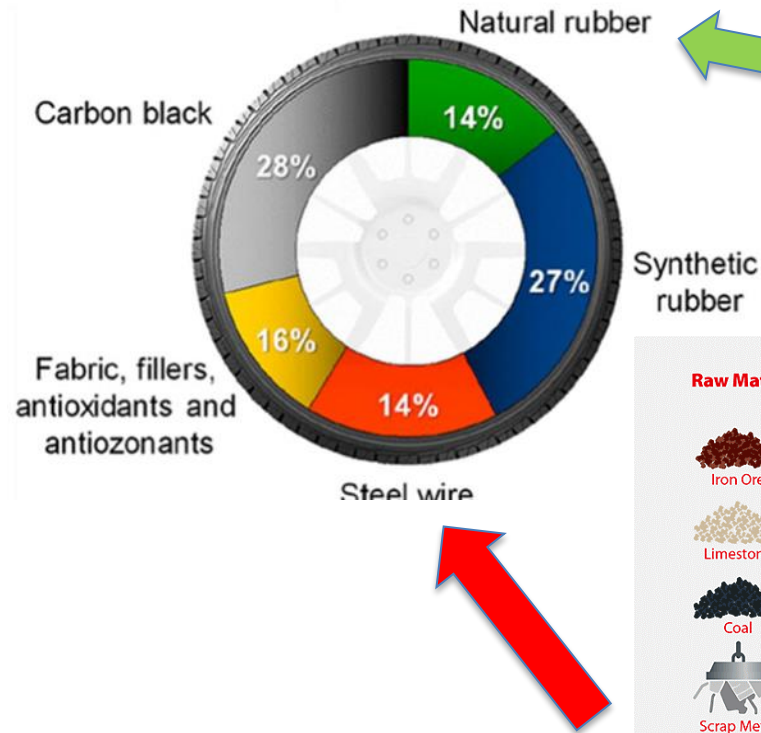
^b Engineering Pathways, Gallogly College of Engineering, University of Oklahoma, Norman, OK, United States

Available online 1 March 2023, Version of Record 3 March 2023.

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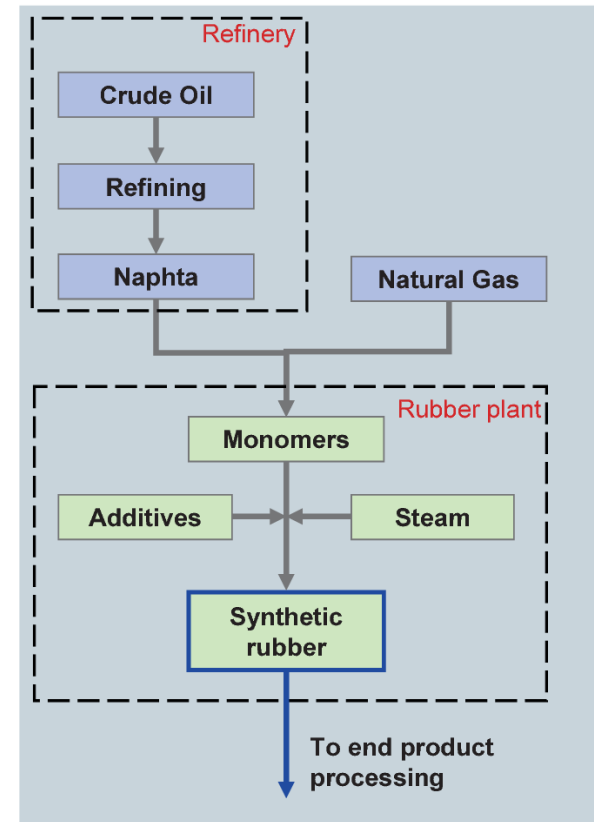
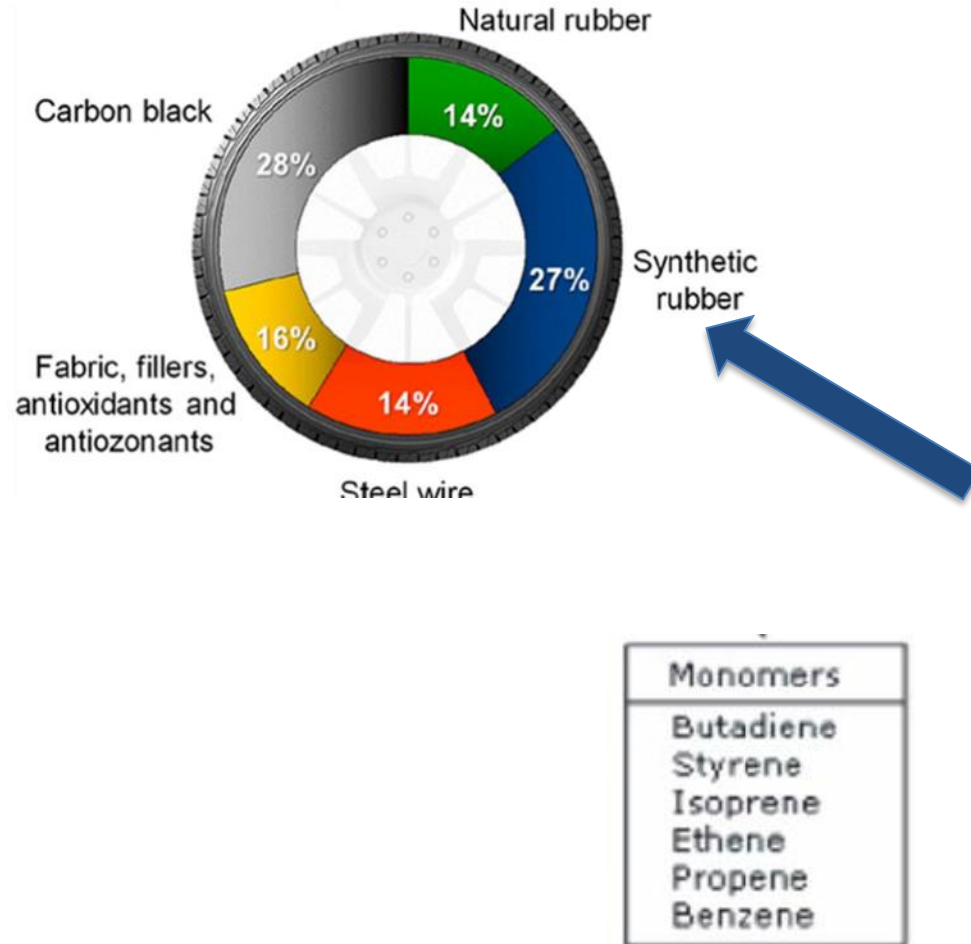
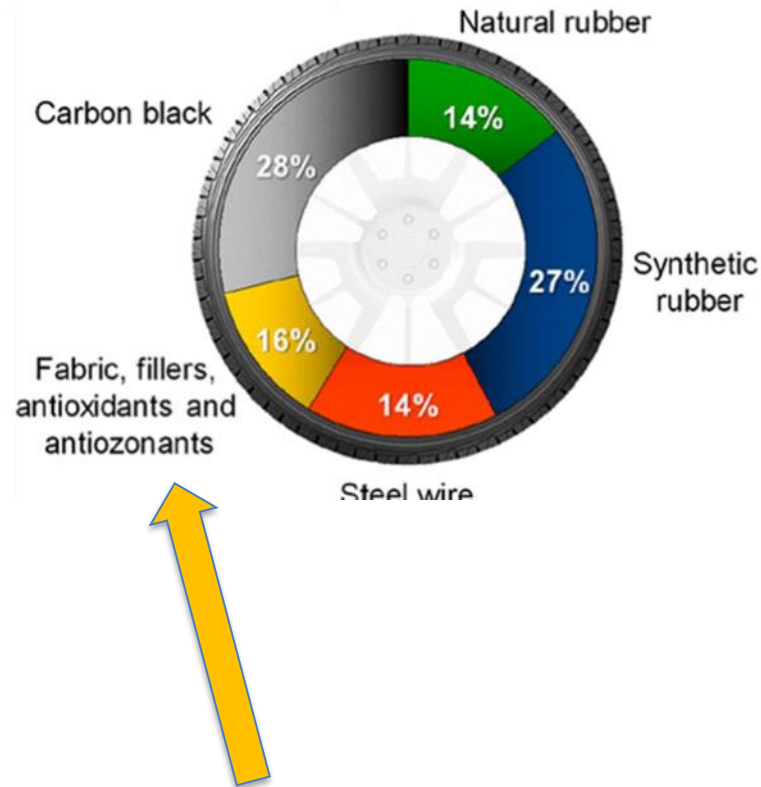


Fig. 1: Generic production process of synthetic rubber



polyethylene terephthalate (PET) yarn



Journal of Cleaner Production
Volume 137, 20 November 2016, Pages 667-676



Comparative life cycle assessment of fossil and bio-based polyethylene terephthalate (PET) bottles

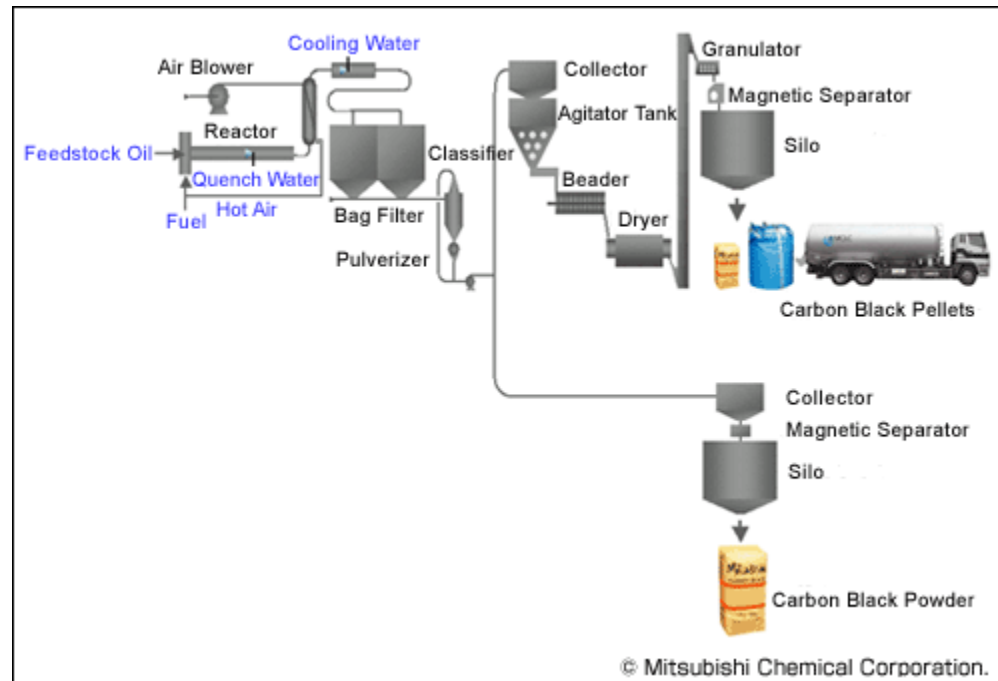
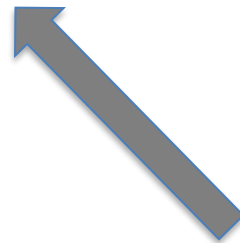
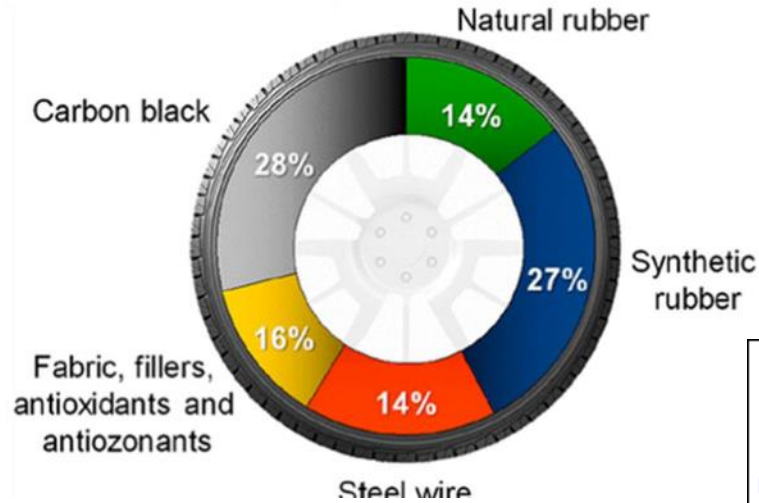
Luyi Chen^{a,b}, Rylie E.O. Pelton^{a,b}, Timothy M. Smith^{a,b}

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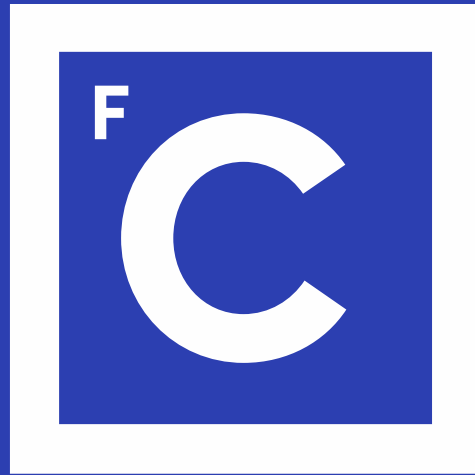
<https://doi.org/10.1016/j.jclepro.2016.07.094>

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Thanks



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