



Re-refined lubricants: A tool in the industry's sustainability toolbox

A Presentation for:



September 2022



Reflection on yesterday's sessions: Embrace complexity but with the bias for action

Focus on what we know, vs what we don't (yet)

Urgency on the customer side requires deploying multiple tools and learning by doing

- Baseoils will be one of the major areas of impact for a more sustainable lube value chain
- Full LCA remains a challenge, but should this be a barrier for action?
- It's not Bio OR Re-refined => it is when and how deployed to maximize the impact

Perspective matters: Cradle-to-gate vs Cradle-to-Cradle view

- The choice of lens has consequences for re-refining => Circularity vs Carbon footprint

Is more within your control than we sometimes choose to recognize?

- Regulations, common frameworks remain a challenge but there are steps we can control to explore what re-refining can offer

The renaissance in used oil re-refining has multiple drivers - some fundamental, others unpredictable

The re-refining of today is a different business from a decade ago

Fundamental

- Extended Producer Responsibility regulations are spreading outward from Europe
- Leading lubricants marketers' sustainability goals make it impossible to ignore re-refined base oils
- Improving lubricant quality is driving higher quality re-refined base oils (better inputs, better processing technologies)
- A slow, but progressive, erosion of the re-refined price discount is occurring
- Successful, professionally-managed integrated used oil collector/re-refiners have emerged => better supply security
- Supply chain challenges: Re-refining often offers a local supply source

Unpredictable

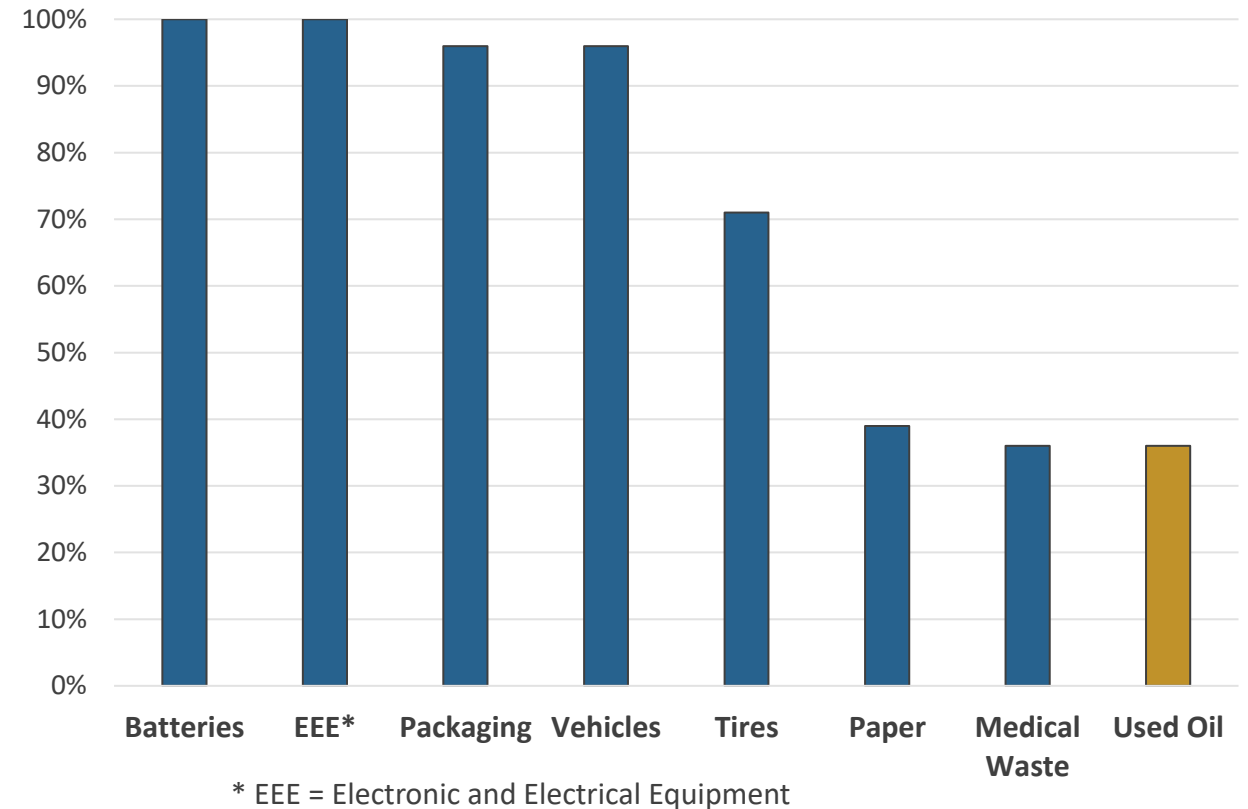
- *Crude oil prices*
- *Regulatory pathways in different regions/countries/territories*
- *Global events like COVID-19*

Potential for impact: Roughly 20 countries around the world have adopted various forms of used oil EPR scheme to date, notably led by the EU though used oil has not been at the forefront of waste management

EPR Schemes Adopted for Used Oil, 2022

- North America: **Canada** (except Ontario), U.S. (effectively only California)
- Latin America: **Brazil**, Chile
- **Europe**: Belgium, Bulgaria, Cyprus, Denmark, **France**, Greece, **Italy**, Latvia, Netherlands, Poland, **Portugal**, Slovenia, **Spain**, **Turkey**
- AMEA: South Africa
- Asia: **Australia**, China

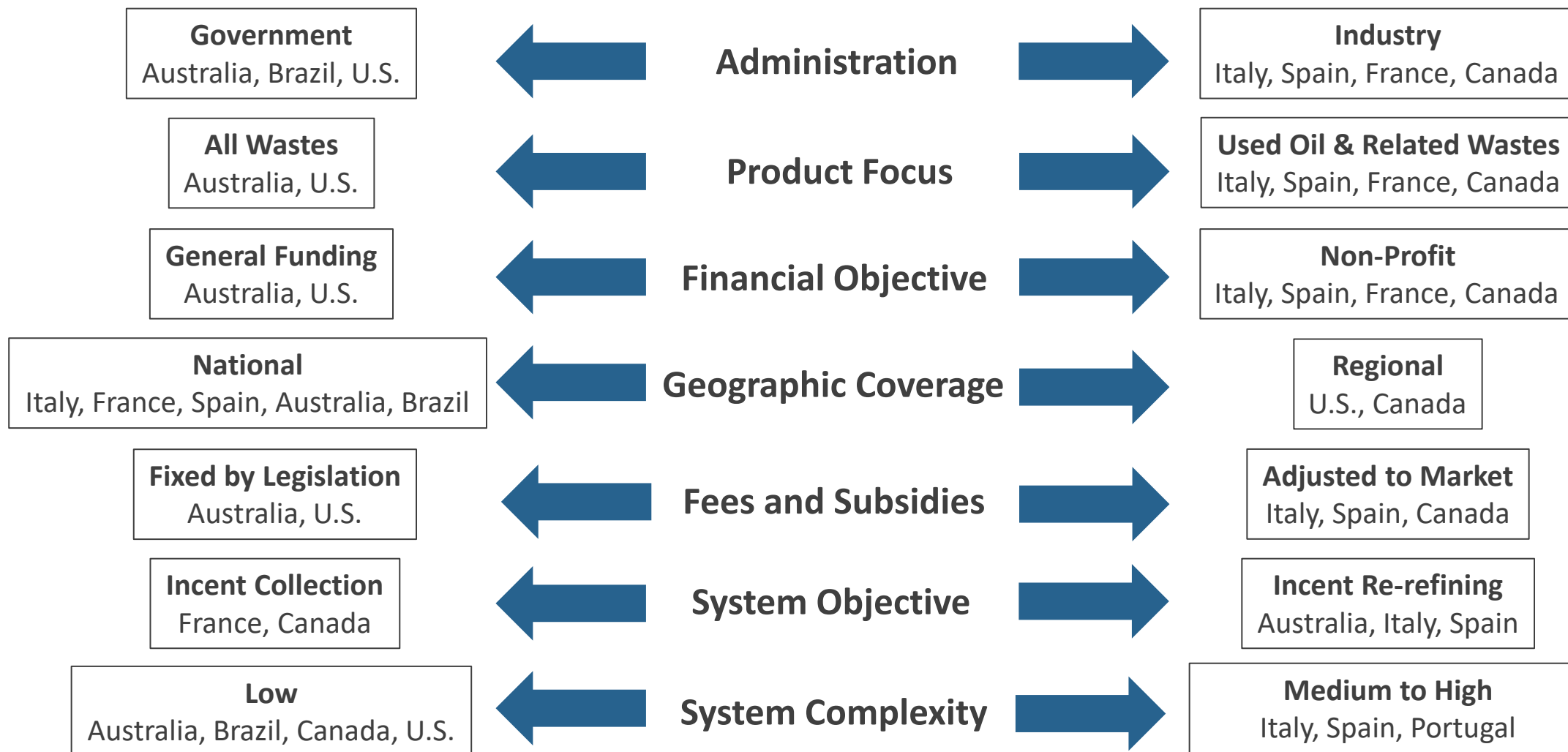
Percentage of EU Members Adopting EPR Schemes, by Waste Category in 2014



Strategy around re-refined oils is regional by its nature

There is no common model of how the leading countries address the circular economy for used oils

Characteristics of Used Oil EPR Systems in Some Key Countries



Circularity Business Model Example: Hydrodec's position in oil re-refining enhanced through carbon credits

NORA member Hydrodec of North America has successfully been approved by the American Carbon Registry (ACR) to generate carbon credits for every gallon of used transformer oil they re-refine

Major players in our industry purchase credits from the likes of Hydrodec

Hydrodec: re-refiner of used transformer oils

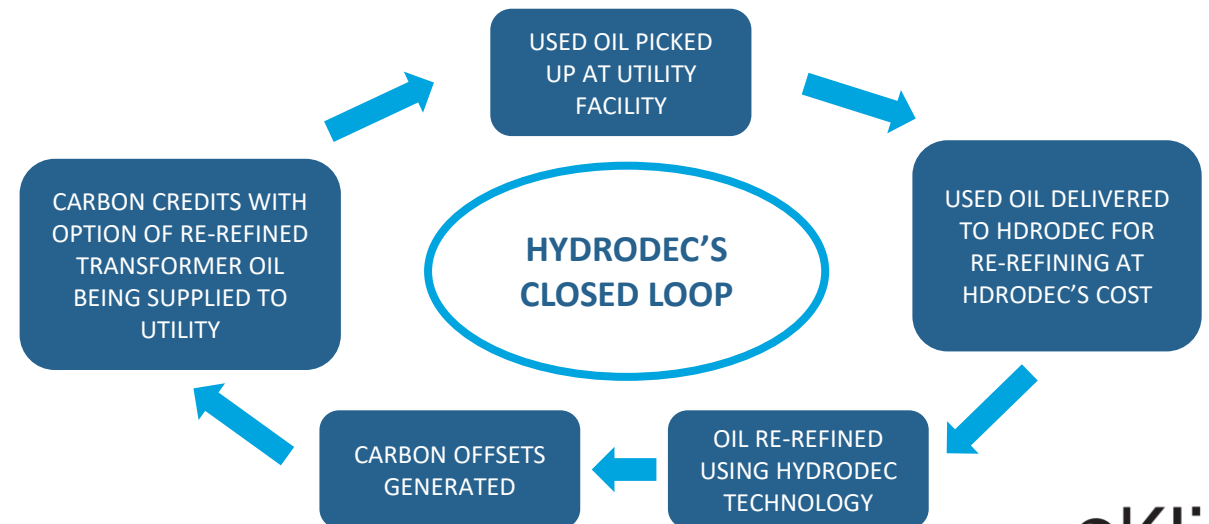
- Hydrodec of North America (HoNA) is the first transformer oil company in the world to generate carbon credits for every gallon of used transformer oil re-refined
- **In return for used transformer oil, Hydrodec is offering the utilities carbon credits based on a formula set by the ACR for the feedstock subsequently re-processed through the company's Canton facility**
- Emission reduction: 165,000 tCO₂e credits issued to date. Average 25,000 tCO₂e per year

Hydrodec's process

- Closed loop
- **Allows for all used transformer oil to be re-refined in return for carbon credits**
- Hydrodec's product: SUPERFINE transformer oil – meets or exceeds published performance standards
- Uses catalytic hydro-treating process
- 99+% process yield
- 67% reduction in energy consumption compared to virgin oil refining

“Critical to the successful disposal of all used oil, including both lubricating and transformer oil, is total clarity over the final destination of such used oil. Currently, this often does not exist.”

- Hydrodec



To conclude – for discussion

- *Re-refined products is a tool to be considered but its application, benefits and limitations are specific to your business => look into it*
- *Interesting interplay between bio and re-refining when it comes to circularity:*
 - *Some challenges in re-refining renewable feedstocks*
- *Beyond baseoils:*
 - *Additive recovery*