The Recycling Industry in a Green Economy:

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v6

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Purpose Statement

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The purpose of this presentation is:

- To discuss recent developments in green economy with special focus on the recycling industry
- To discuss the transferability/adoptability of green economy concepts and tools in our part of the world
- To stimulate new research and business collaborative initiatives for developing bio-economy in our part of the world

Introductory Statement: Green Economy

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- Green economy significantly reduces environmental risks and increases resource efficiency.
- In a green economy, growth in income and employment should be driven by public and private investments to maintain and enhance the natural and human capital as critical economic assets and as a source of public benefits.
- Green economy is knowledge-based
- Green economy achieves net improvement of material and energy efficiency and ultimately aims to reach decoupling material and energy use from economic growth
- Green economy focuses on shifting from non-renewable to renewable resources

Introductory statement:

Green Economy: linkages with recycling

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- Recycling is an eco-industry sub-sector which contributes to a country economic output
- Recycling generates ”green jobs”
- Recycling achieve net reduction in virgin non-renewable resource use including REEs
- Recycling utilizes eco-innovation and enhances new technologies and creates markets for new products and services
- Recycling contributes to a shift to a circular economy away from a linear economy model characterized by resource depletion and waste
- Recycling has lower environmental impacts compared to producing virgin materials
- Recycling helps in minimizing landfill and incineration cost

Presentation Outline

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1. Introduction
2. Waste Types and Definitions
3. Understanding Waste Streams and Markets
4. Concluding Remarks

1. Introduction

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Waste streams can be divided into two main categories:

- Material-related streams: including metals, glass, paper and cardboard, plastics, wood, rubber, textiles and bio-waste
- Product-related streams: including packaging, electronic waste, batteries and accumulators, end-of-life vehicles, mining and construction/demolition waste

Introduction“cont.”

- Material consumption global average is 5 ton/person/year
- Distinction between non-renewable resources (minerals and oil) and renewable resources (e.g biomass). There is an interrelation since the second needs nutrients (e.g P and K) and micronutrients (e.g Selenium)
- Recycling is targeting non-renewable resources as well as renewable resources. Recycling of renewable resources (such as paper) contributes to more efficient supply of resources (land, water and energy)

Introduction “cont.”

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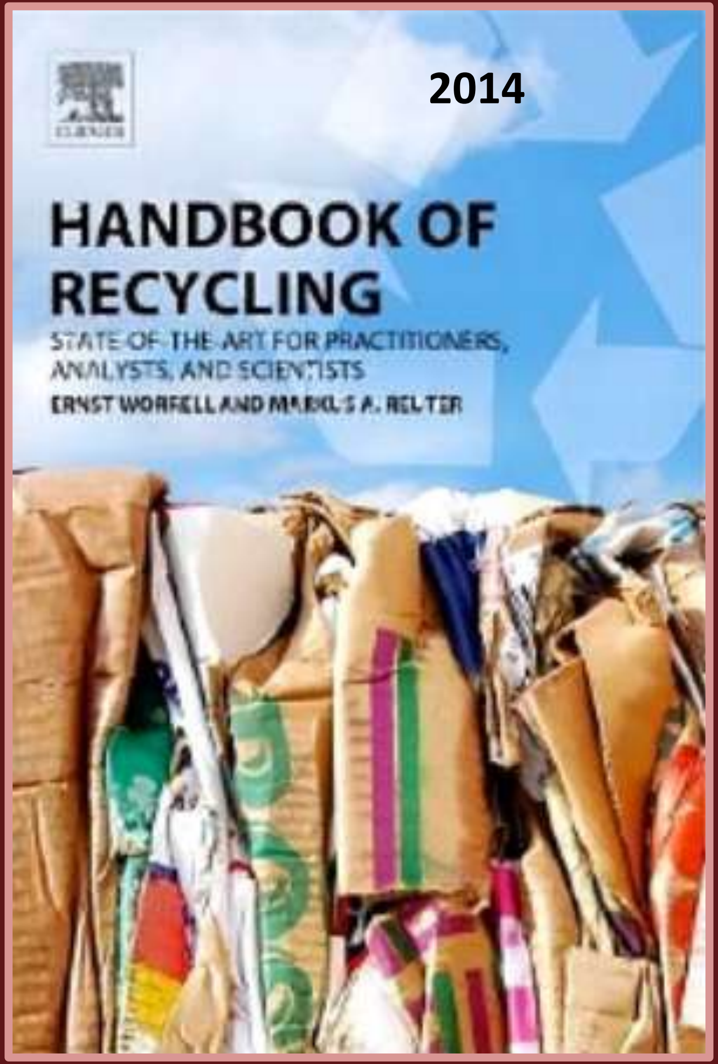
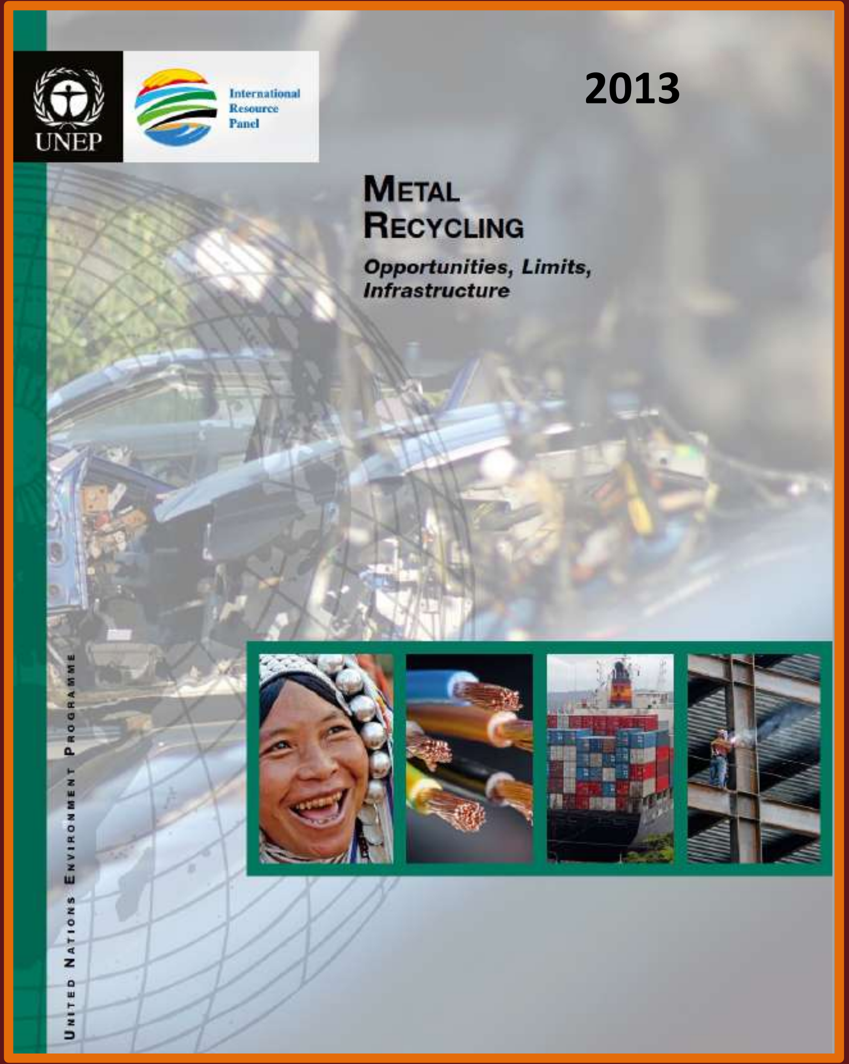
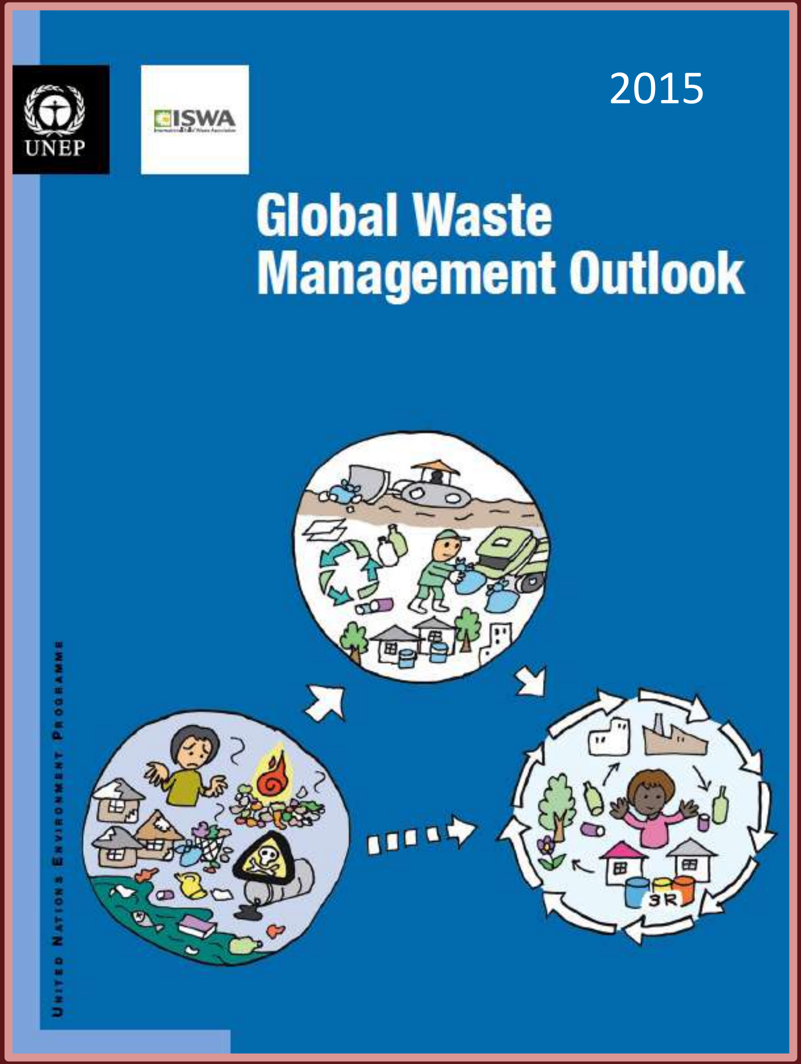
- Recycling rates differ for every material and for every industry, the global recycling rate of paper is currently 56% (ICFPA, 2013). Europe is the leader, with a paper recycling rate of 70%.
- Recycling rates for metals vary from very high (gold) to negligible for many specialty metals, such as lithium and tellurium. Recycling rates tend to be higher when the metals are used in large quantities in easily recoverable applications (e.g. lead in batteries, steel in automobiles).
- In this context, Porter (2002) distinguishes between economies of scale in recycling (unit costs of recycling go down when the supply of waste material increases) and diseconomies of scope (unit costs of recycling go up when the number of different recyclable materials and applications increases.

Focus on Recycling: important references







2. Waste Types: The Importance of Waste Definitions

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1. Production or consumption residues
2. Off-specification products
3. Products whose date for appropriate use has expired
4. Materials spilled, lost or having undergone other mishap, including any materials, equipment, etc., contaminated as a result of the mishap
5. Materials contaminated or soiled as a result of planned actions (e.g. residues from cleaning operations, packing materials, containers, etc.)
6. Unusable parts (e.g. reject batteries, exhausted catalysts, etc.)
7. Substances which no longer perform satisfactorily (e.g. contaminated acids, contaminated solvents, etc.)
8. Residues of industrial processes (e.g. slags, still bottoms, etc.)

Waste Definitions, cont'd.

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9. Residues from pollution abatement processes (e.g. scrubber sludge, baghouse dusts, spent filters, etc.)
10. Machining/finishing residues (e.g. lathe turnings, mill scales, etc.)
11. Residues from raw materials extraction and processing (e.g. mining residues, oil field slops, etc.)
12. Adulterated materials (e.g. oils contaminated with PCBs, etc.)
13. Any materials, substances or products whose use has been banned by law
14. Products for which the holder has no further use (e.g. agricultural, household, office, commercial, etc.)
15. Contaminated materials, substances or products resulting from remedial action with respect to land any materials, substances or products which are not contained in the above categories.

Waste Definitions, cont'd.

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EU Examples of Relevant Waste Sources

- Households
- Municipal services
- Industries
- Agriculture/forestry
- Institutions, trade/commerce and offices
- Construction and demolition sites
- Power plants
- Mining
- Wastewater treatment plants
- Waste treatment plants

EU Examples of Relevant Waste Streams

EU Priority waste streams:

- Municipal waste
- Packaging waste
- Tyres
- Waste electrical and electronic equipment
- Construction and demolition waste
- Hazardous waste
- End-of-life vehicles
- Health care waste
- Waste oil
- Sewage sludge

Other relevant waste streams:

- Organic residues (garden waste)
- Cardboard
- Plastics
- Iron
- Other metals
- Agricultural waste
- Industrial waste
- Food and organic waste
- Paper
- Textiles
- Inert residues
- Batteries
- Bulky waste
- Mining waste

Source: European Commission, Environment DG, Preparing a Waste Management Plan, May 2003

Waste Definitions, cont'd.

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EU Classification of Local and/or Regional Waste Management System

- Collection equipment (bins, vehicles)
- Transportation schemes (transport logistics, location of treatment plants)
- Transfer/sorting facilities
- Types of treatment plants (e.g. landfills, incineration plants)
- Recycling activities - both run by authorities and private organisations (e.g. the Red Cross)
- Payment schemes
- Regulation (national as well as local)

Waste Definitions, cont'd.

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USA: Recycling Industry Company Types

- Scrap Metal Processors: Primarily handle metal scrap but also have diversified into other recyclable materials.
- End Use Manufacturers: Use recyclable materials as a feedstock to manufacture products.
- Multi-material Processors: Clean, sort, densify and process a variety of recyclable materials for shipment to end-use manufacturers.
- Recycling Collectors: Collect recyclables from homes, businesses, and industry.
- Equipment Dealers: Sell trucks, balers, and other equipment to recycling companies.
- Reuse Companies: Refurbish and reclaim laser cartridges, metal drums, and building materials.
- Oil and Chemical Recyclers: Reprocess and recycle chemicals, oils and paints.
- Textile Recyclers: Reuse or recycle textiles and fibers.
- Paper Stock Processors: Sort and bale paper and cardboard.
- Materials Brokers: Broker metal, paper, and plastic.
- Pallet and Wood Companies: Refurbish pallets and process scrap wood.
- Tire Recyclers: Retread, process or recycle tires.
- Education Groups: Provide recycling education.

3. Understanding Waste Streams and Markets

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- The waste industry depends closely on the secondary materials in its local and foreign markets.
- Some markets are relatively local, for example for compost or for aggregates from C&D waste. Others may be national or regional, such as for glass and alternative fuels made from MSW
- The secondary materials which are globally traded commodities include ferrous and non-ferrous metals, paper and board (‘recovered paper’ or ‘recovered cellulose fiber’), plastics and textiles. The use of recycled materials competes with and displaces the use of primary materials and helps reduce the extraction of virgin material resources and reduce greenhouse gas emissions.

Secondary Materials Market

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- In 2010, 700 to 800 million tons of “waste” were recycled as “secondary commodities”, derived from MSW as well as other waste streams.
- In terms of both tonnage and value, recycling markets are dominated by ferrous scrap (steel). In tonnage terms this is followed by paper and board, whereas in terms of value non-ferrous metals rank second, with aluminum and copper dominating this market.
- Only a relatively small proportion of the total 700 to 800 million tons (likely less than 25%) is traded across national boundaries.
- Asia makes up the most dynamic and arguably the most important global recycling market

Total turnover of recycling of seven key recyclables in the EU, 2004 and 2006–2009

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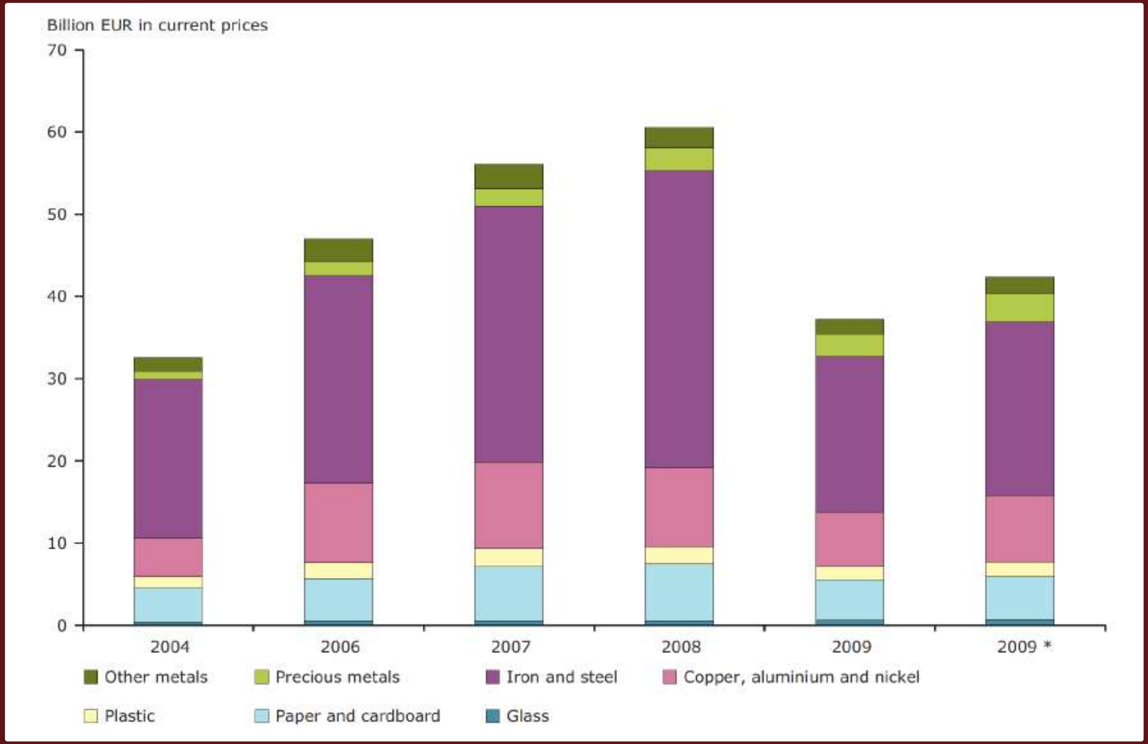

EEA Report, Earnings, jobs and innovation: the role of recycling in a green economy, 2011

3.1 Ferrous Metals

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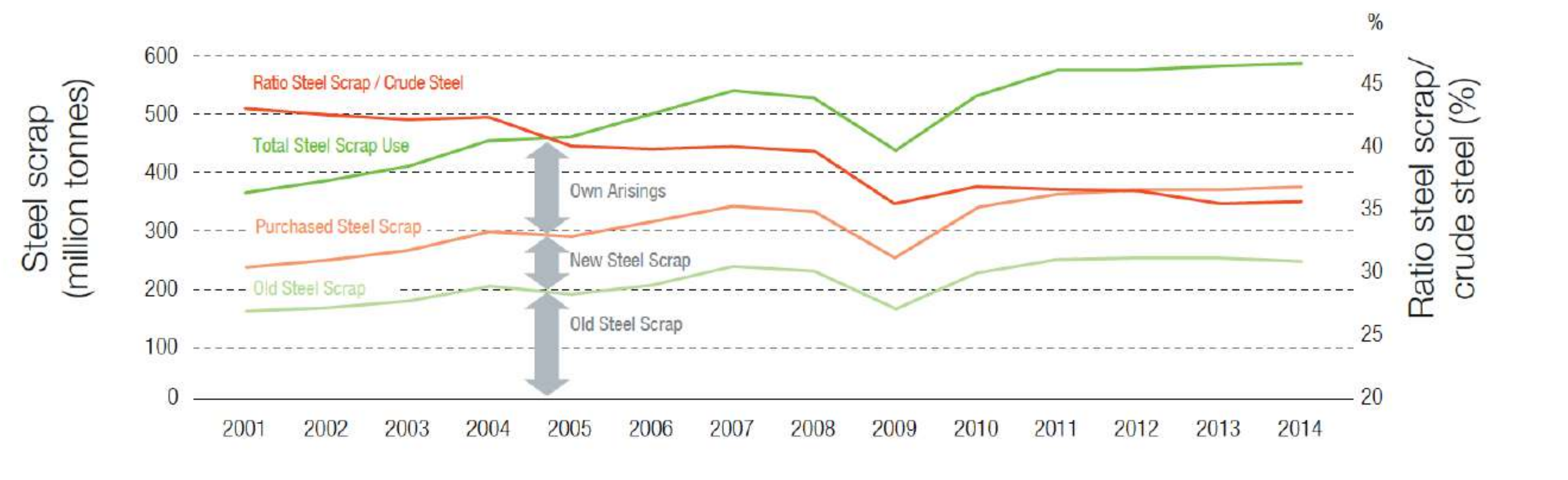
- Every ton of ferrous metal scrap that goes back into production reduces the use of iron ore by 1,400 kg, of coal by 740 kg, and of limestone by 120 kg.
- The figure shows a steady increase in scrap use from 2001-2014, By 2011-2014, total steel scrap use was approaching 600 million tpa, approximately 40% of total steel production.
- Scrap can be grouped into the three sources of (i) post-consumer (old) scrap; (ii) new scrap (e.g. production off-cuts) purchased by steel mills from industrial users; and (iii) own arising, directly recycled within the steel mills (rejects from melting, casting and rolling)



3.2 Non-Ferrous Metals

COMMODITY	GLOBAL DEMAND FOR METAL*			GLOBAL SCRAP CONSUMPTION		
	2000 (Million tonnes)	2011 (Million tonnes)	Percentage growth 2000-2011*	2000 (Million tonnes)	2011 (Million tonnes)	Percentage growth 2000-2011
Aluminium	25	45	82%	11	18	68%
Copper	15	19	30%	7.0	10	45%
Lead	9	12	30%	3.7	5.8	57%
Zinc	7	10	40%	0.8	1.1	34%
Nickel	1	1.1	10%	0.6	0.9	42%
Steel	1144 (2005 data)	1607	(40%)	401	573	43%

Global demand for primary metal has been rising quickly, as has global scrap consumption. The last row for steel is shown for comparison. The non-ferrous metal tonnages are 35 to 1,000 times lower.

Source: Bureau of International Recycling (2011). Global non-ferrous scrap flows 2000-2011. Available from http://www.bir.org/publications/brochures

End-Of-Life (EOL) Recycling Rate for 60 Metals

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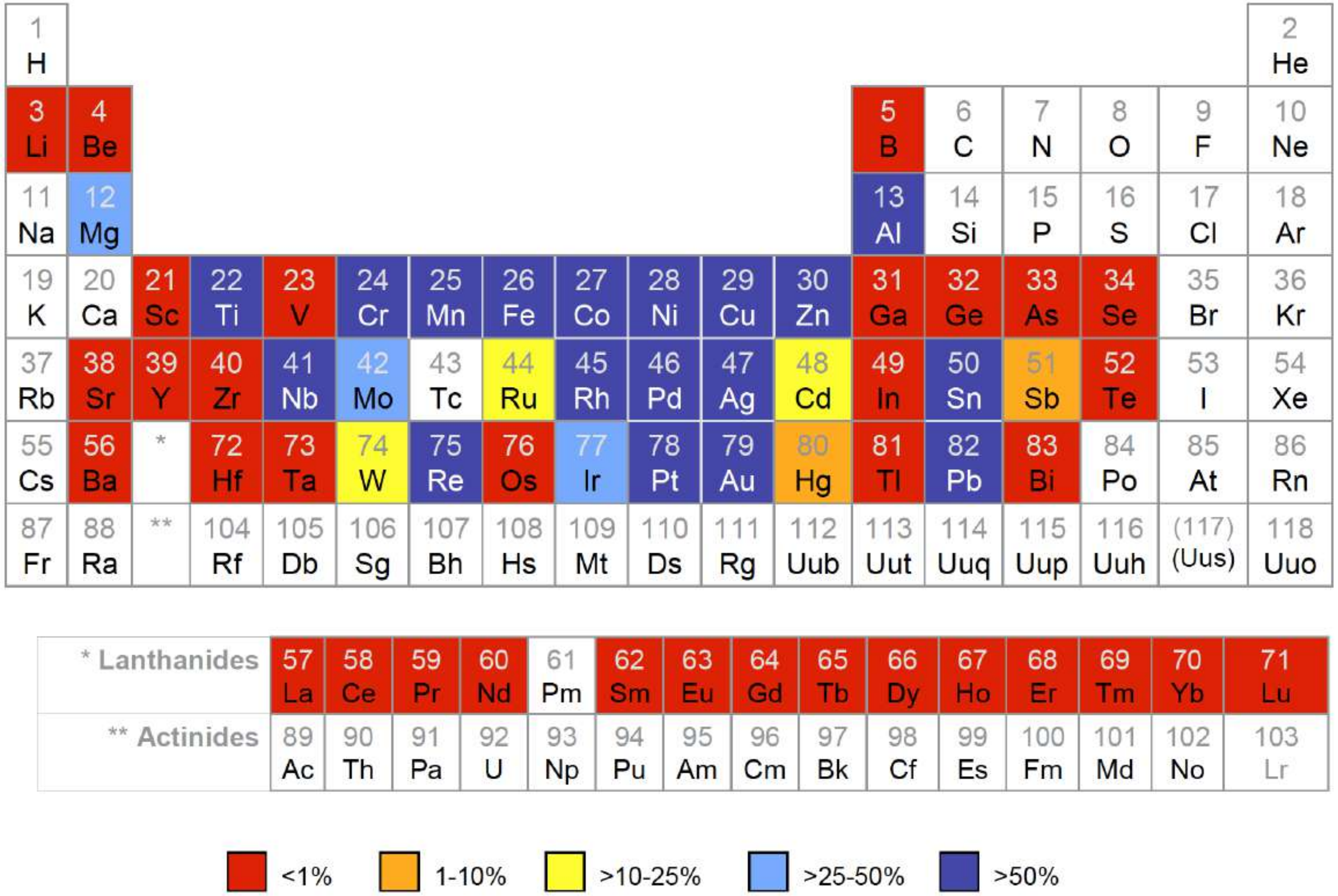
Notes:

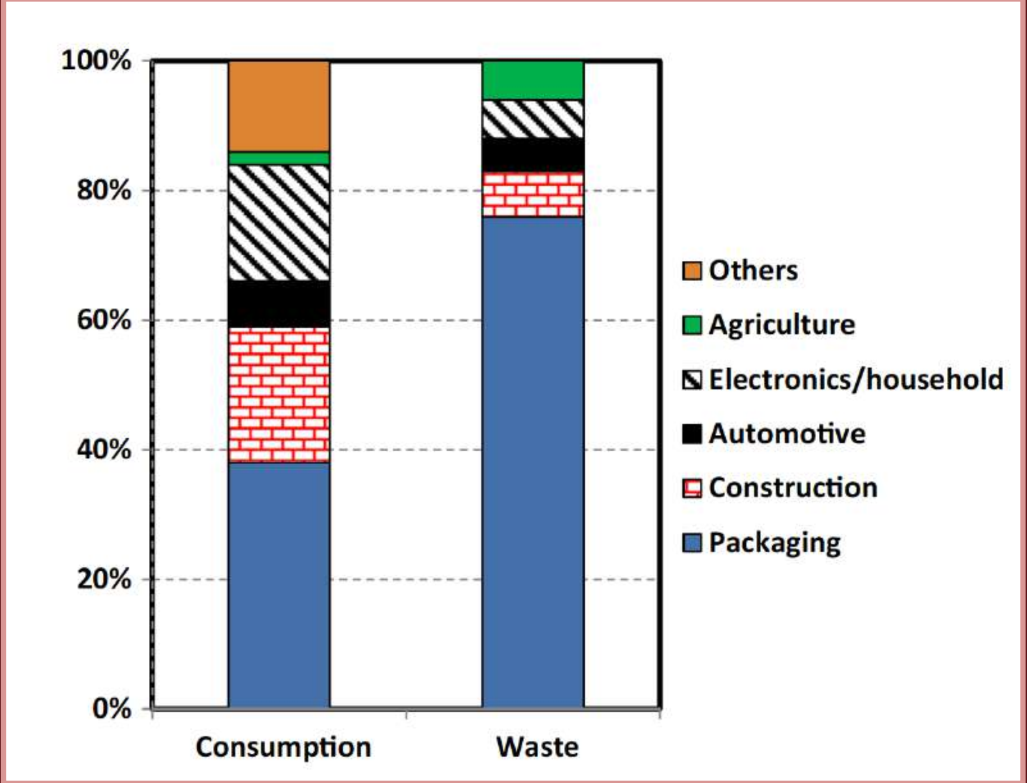
1. The figure uses the periodic table to show the global average end-of-life functional recycling for sixty metals. Functional recycling is recycling in which the physical and chemical properties are retained for subsequent use. Unfilled boxes indicate that no data or estimates are available.
2. The End -of-Life (EOL) Recycling Rate (RR) relates to whatever form (pure, alloy, etc) recycling occurs.
3. Note that only 18 out of 60 metals have EOL-RR values above 50%, another 3 metals are in the 25-50% group and three more in the 10-25% group.



Source: UNEP (2011b). Recycling Rates of Metals: A Status Report.
http://www.unep.org/resourcepanel/Portals/24102/PDFs/Metals_Recycling_Rates_110412-1.pdf

3.3 Plastics

- International trade in used plastics is prospering. With global production of plastics sky-rocketing, from 1.5 million tons in 1950 to 204 million tons in 2002 and 299 million tons in 2013, and a continuing shift of production from the West to Asia (more than 40% by weight of world production in 2013), the annual volume of transnationally traded waste plastics at 15 million tons represents just 5% by weight of new plastics production.
- Plastic scrap flows from Western countries with established recycling collection systems mainly to the PRC, which dominates the international market , receiving around 56% wt. of global imports. Europe (EU-27) collectively exports almost half of the plastics collected for recycling, at least 87% of which goes to the PRC.



Distribution of plastic applications in consumption and waste in the European Union.

Establishing Standards for Plastic Waste Stream

Waste Standards:
Institute of Scrap Recycling Industries (ISRI) Guidelines

The Global Plastic Scrap Standards - ISRI Guidelines

- **ISRI – Institute of Scrap Recycling Industries**
  - Guidelines Publication: ISRI Scrap Specifications Circular 2007
- **The ISRI guidelines**
  - internationally accepted standards
  - facilitate the trading of plastic scrap commodities based on an agreement that each bale of the material will be made according to a specific recipe of material ingredients depending on the code (grade) used as the

Plastic Grade Coding System

- P 0 0 0 X X
  - The coding system for baled recycled plastic consists of a three digit number with a prefix letter "P" and a two-letter suffix. The prefix "P" designates the category of Plastics and differentiates the code from similar codes for metals and other materials. The first digit corresponds to the SPI resin identification code system and designates the primary plastic material. The second digit describes the plastic/product category. The third digit defines the color/appearance of the product. The first suffix letter indicates the type of recycled plastic. The second suffix letter indicates the source of the recycled plastic product.

Plastic Grade Coding System

P	0	0	0	X	X
Plastic	Resin Code	Product	Color	Type	Source
	0 Mixed Resins (1-7)	0—Bottles	0—Mixture	P—Post Consumer	M—Municipal
	1 PET	1—Rigids	1—Natural	R—Recovered	I—Industrial
	2 HDPE	2—Films	2—Pigment/Dyed		C—Commercial
	3 PVC	3-9 To be assigned	3-9 Designated within each category		S—Institutional
	4 LDPE				
	5 PP				
	6 PS				
	7 Other				
	8 To be assigned				
	9 To be assigned				

3.4 Recycled Paper

Recycled paper and paperboard is a major raw material used in the paper industry. In 1990, recovered paper accounted for 40% of the total pulp used in the European paper industry, and by 2013 this had risen to 53%.

This increase in ‘recycled content’ was driven mainly the increase of supply from municipal solid waste recycling

Unit: Million tonnes

Region	Country	Collections of recovered paper and board	Consumption of recovered paper	Net flows: positive = imports negative = exports	Regional total net flows	
					2012	1997
North America	United States	46.3	26.3	-20.0	-22	-6
	Canada	4.4	2.6	-1.8		
	Regional subtotal	*50.6*	*29.9*	*-21.8*		
Latin America	Brazil	4.5	4.5	0.0	**1**	
	Mexico	**3.9**	**4.8**	**0.8**		
	Regional subtotal	*12.2*	*13.1*	*0.9*		
	Germany	**15.3**	**16.2**	**0.9**	-7	-1.6
	United Kingdom	8.2	3.8	-4.4		
	France	7.3	5.0	-2.3		
	Italy	6.2	4.7	-1.6		
	Spain	**4.6**	**5.1**	**0.5**		

- ‘Collections’ shows national totals of recovered paper and board collected by the secondary paper industry.
- ‘Consumption’ shows national consumption of recovered paper by the paper industry (domestic deliveries plus imports)
- ‘Net flows’ shows national consumption less national collections: a positive figure denotes a net importing country (highlighted in bold); a negative figure denotes a net exporter. Note that some countries may be both a significant importer and a net exporter. Examples include the Netherlands and Belgium, where the ports of Rotterdam and Antwerp handle exports on behalf of a number of countries.

3.5 Glass

The main source of glass for recycling is packaging, which accounts for 65% of the glass produced in the EU in 2014. On average, 70% of container glass is recycled in the EU, and new container glass uses 52% of glass cullet (crushed glass used as secondary raw material). Glass is mainly recycled as packaging and glass wool.

Recycling enables energy and cost savings in the production process. Because cullet melts at a lower temperature than raw materials, recycling can save around a third of the energy used in production. The by-products of the production process are usually re-used immediately. The recycling process needs glass cullet to be sorted by color (white or colored), either at source or after collection at extra cost, and to be clean of impurities such as labels, metal, ceramics or cork. Glass containing lead (e.g. lead crystal) must not be mixed with lead-free glass. The main challenges for glass recycling are that lead concentration tends to rise after consecutive recycling processes; and that flat glass, which accounts for 26% of European glass production, is under-used in recycling (both as a source and as a product of secondary raw material).

Source: European Parliamentary Research Services (EPRS), Understanding Waste Streams, Briefing, July 2015

3.5 Glass

جراح مركز أجا – محافظة الدقهلية

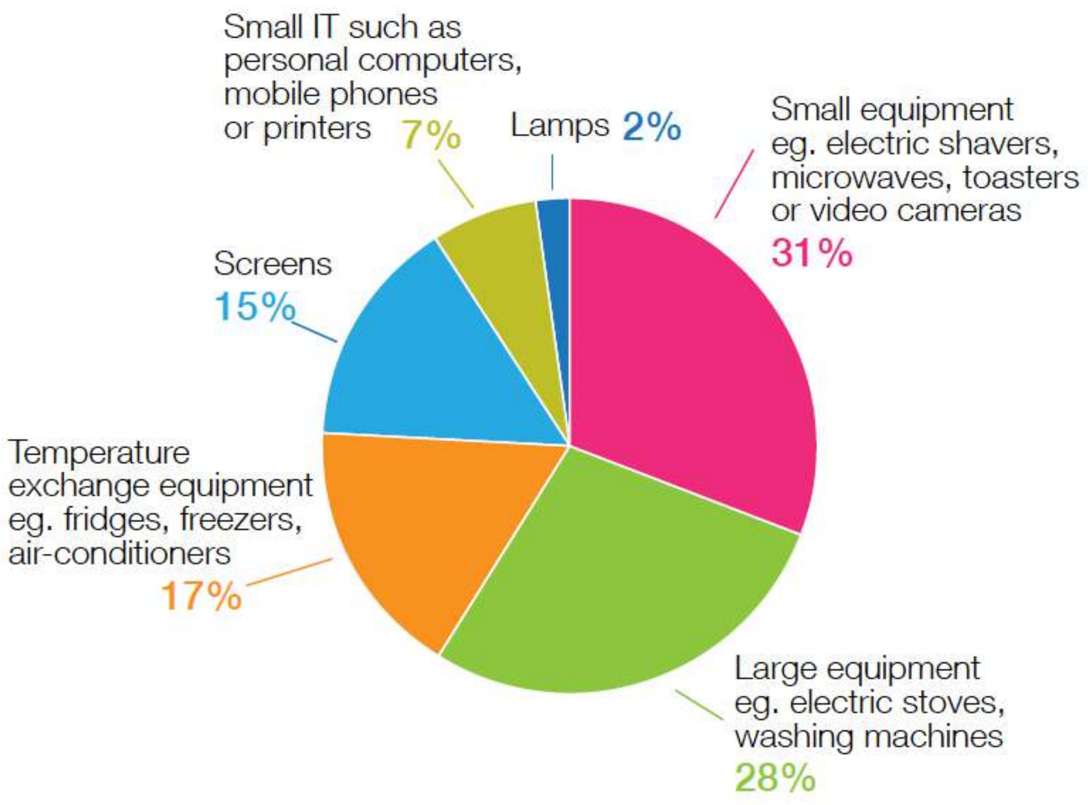
قرية متخصصة في تدوير الزجاج

3.6 E-Waste

A 2015 report by the United Nations University (UNU) estimated that 41.8 million tons (Mt) of e-waste was generated in 2014, almost 25% more than the 2010 figure of 33.8 Mt.2 The amounts of e-waste generated by type are shown in the figure .

Most of this waste was generated in Asia (16 Mt), followed by Europe (11.6 MT), North America (7.9 Mt), Latin America and Caribbean (3.8 Mt), Africa (1.9 Mt). However, in e-waste generation per capita, Europe has the highest figure (15.6 kg/person) and Africa the lowest (1.7 kg/person).

Estimated annual generation in the coming years are as high as 50 Mt in 2018.



3.7 C&D Waste

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Construction and demolition (C&D) waste is generated during the construction, renovation or demolition of buildings, roads, bridges, flyovers, subways, and so on.

Best estimates include 8200 million tons of C&D waste generated across the EU in 2012, 77 million tons in Japan, 33 million tons in China and 17 million tons in India (all in 2010), and almost 7 million tons in each of the fast developing cities of Dubai (2011) and Abu Dhabi (2013).

C&D waste often represents the largest proportion of total waste generated: for example, C&D waste accounts for 34% of the urban waste generated within OECD countries. The volume of C&D waste is also sharply increasing, reflecting the pace of infrastructure development across the world.

Wood:
- Used for Animal Bedding, Mulch, Diesel Fuel, Electrical Power Plants and Particle Board

Bricks, Concrete and Other Masonry Products
- Crushed and used for Fill, New Roads, Under lament for Concrete Applications

Metals (Ferrous and Non-Ferrous)
- Melted into New Products

Roofing Material:
- Asphalt Roads

Cardboard:
- Processed used New Cardboard Products

Plastic:
- Made into bottles, floor tile, paneling, plastic lumber, etc.

3.8 Used Tyres Waste

More than 17 million tons of used tyres are produced globally each year. The widely differing chemical compositions and the cross-linked structures of rubber in tyres are the prime reason why they are highly resistant to biodegradation, photochemical decomposition, chemical reagents and high temperatures. The increasing numbers of used tyres therefore constitute a serious threat to the natural environment.

Used tyres are perceived as a potential source of valuable raw materials due to recent developments in dealing with polymer wastes. More efficient recovery and recycling technologies have led to solutions enabling this substantial stream of rubber wastes to be converted into energy or new polymer materials.


Waste Management 32 (2012) 1742–1751

Contents lists available at SciVerse ScienceDirect

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

ELSEVIER

Review

Progress in used tyres management in the European Union: A review

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التدوير اليدوي لإطارات الكاوتشوك في قرية ميت الحارون

Used Tyres Waste

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3.9 Rare Earth Elements (REE)

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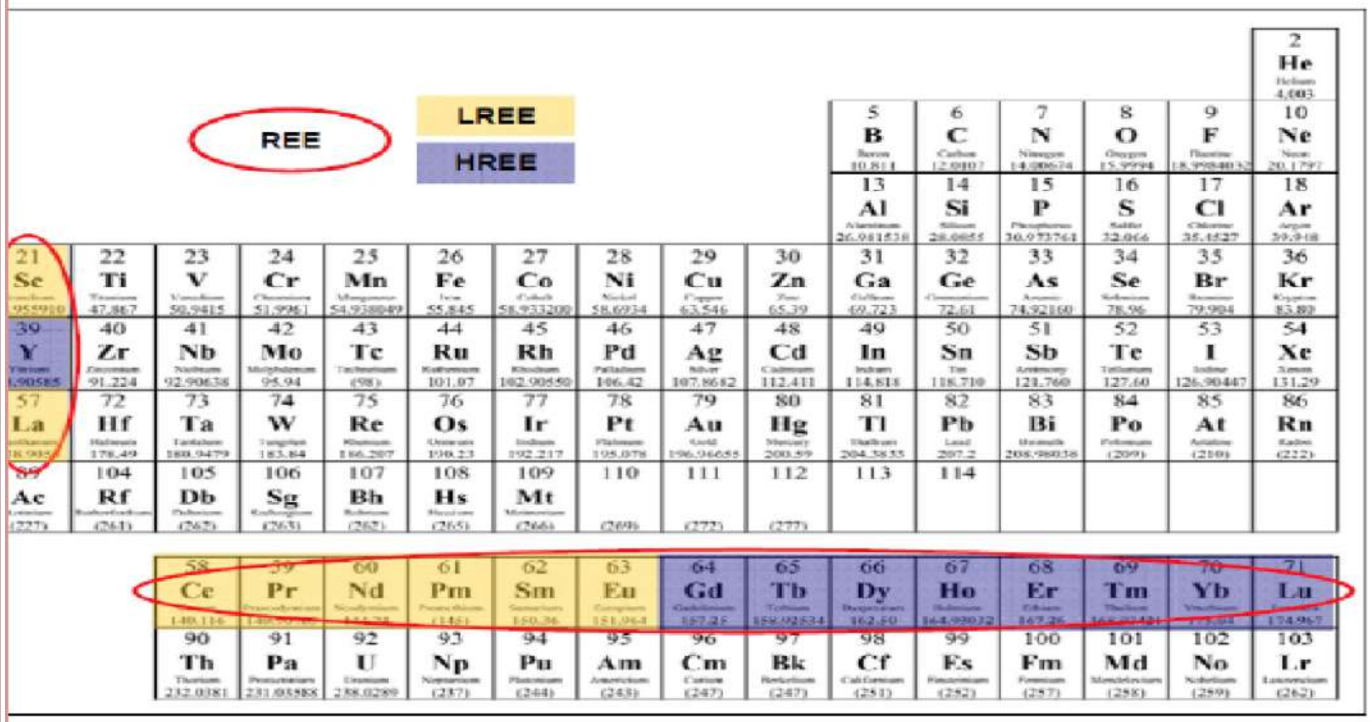
REEs are a group of 17 metals critical to clean energy and high-tech growth industries, and mined overwhelmingly in China. Several studies have been recently published which identify challenges and opportunities linked to the recovery of rare earth elements from electronic waste.



Periodic table of the elements showing the division between LREEs and HREEs (Schuler et al., 2011).

REEs: Important Reference Material

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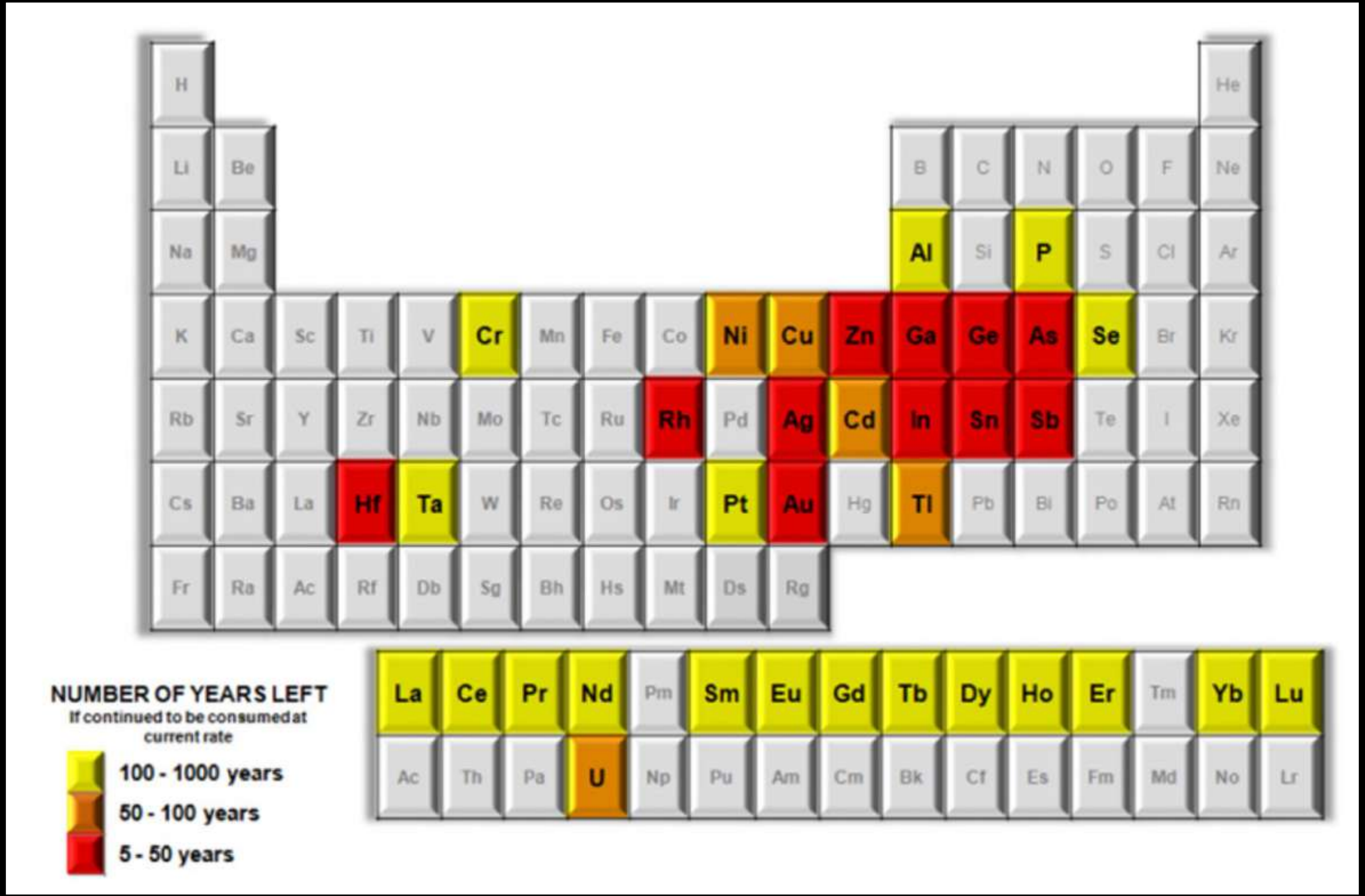
Rare Earth Elements' Processing;
Current and Emerging Technologies, and evolving needs within the Manufacturing Sector

SME (NYC)
October 18,, 2011
Jack Lifton
jacklifton@aol.com

Rare and precious elements sustainability

Many of the advanced technologies like wind turbines, electric cars, energy saving light bulbs, fuel cells and catalytic converters, require rare metals for their production. Traditional supplies of these elements are running out reserves , indium for example, vital for LCD screens, solar cells and semiconductors, may be used up in 13 years . Unlike oil there are no bio-derived alternatives for palladium or platinum. These are finite elements and we are quickly dispersing them throughout our environment, making it more costly and difficult to recover them.



Number of years remaining of rare and precious metal reserves if consumption and disposal continues at present rate

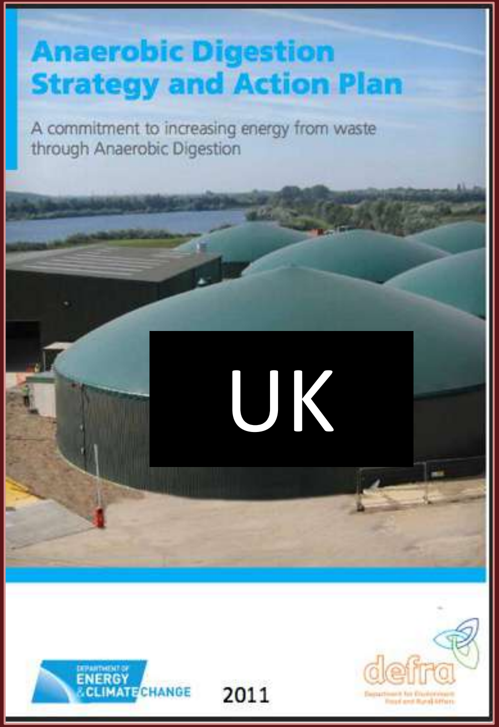
Source: Donson, J.R et al, Elemental sustainability: towards the total recovery of scarce metals, Chemical engineering and processing, 51, 2012

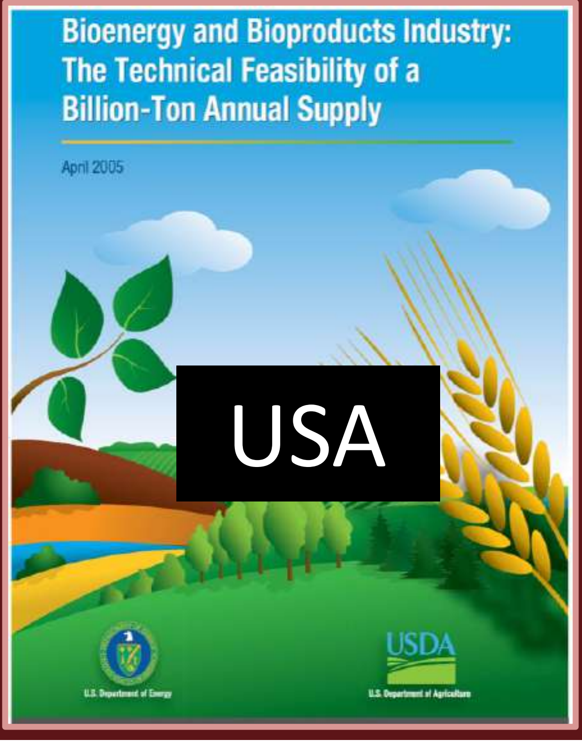
3.10 Biowaste

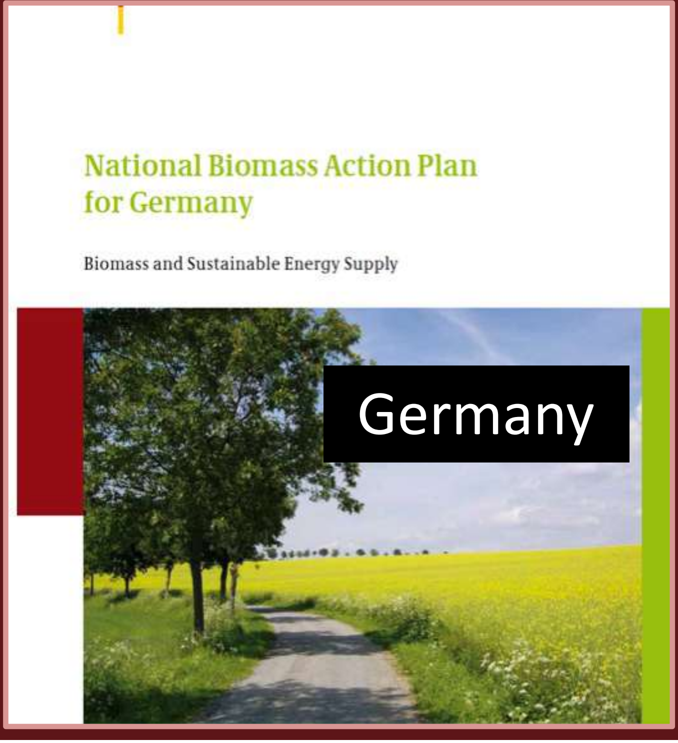
- The European energy production from biogas reached 6 million of oil equivalent (Mtoe) in 2007 with yearly increase of 20%.
- Germany has become the largest biogas producing country in the world. Number of biogas production units in operation is 7700 (2016) producing more than 8 billion cu m of biomethane as well as roughly the samr amount of “green” carbon dioxide per year (www.euroobserv-er.org).

National Biomass Strategy: a Necessity

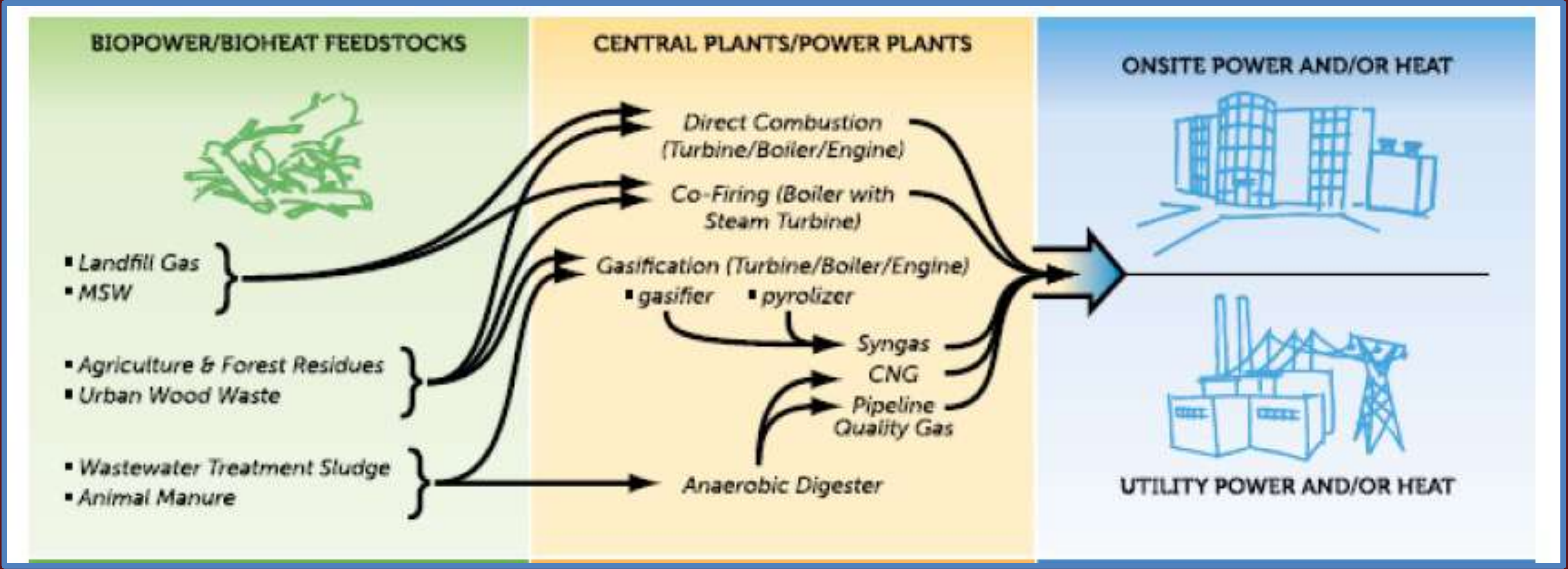
National Biomass Strategies and Action Plans, four examples:
- UK
- Germany
- Malaysia
- USA a billion ton annual supply target





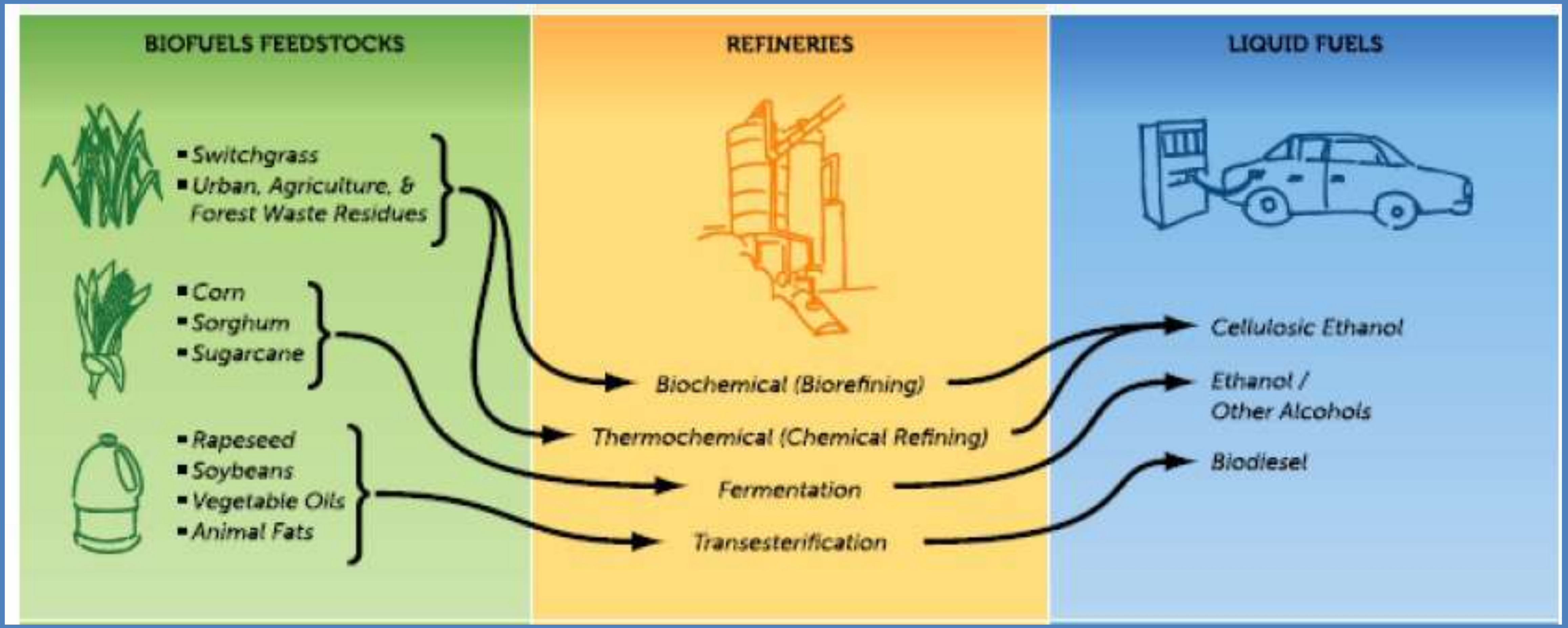


Biomass to Bio power Pathway



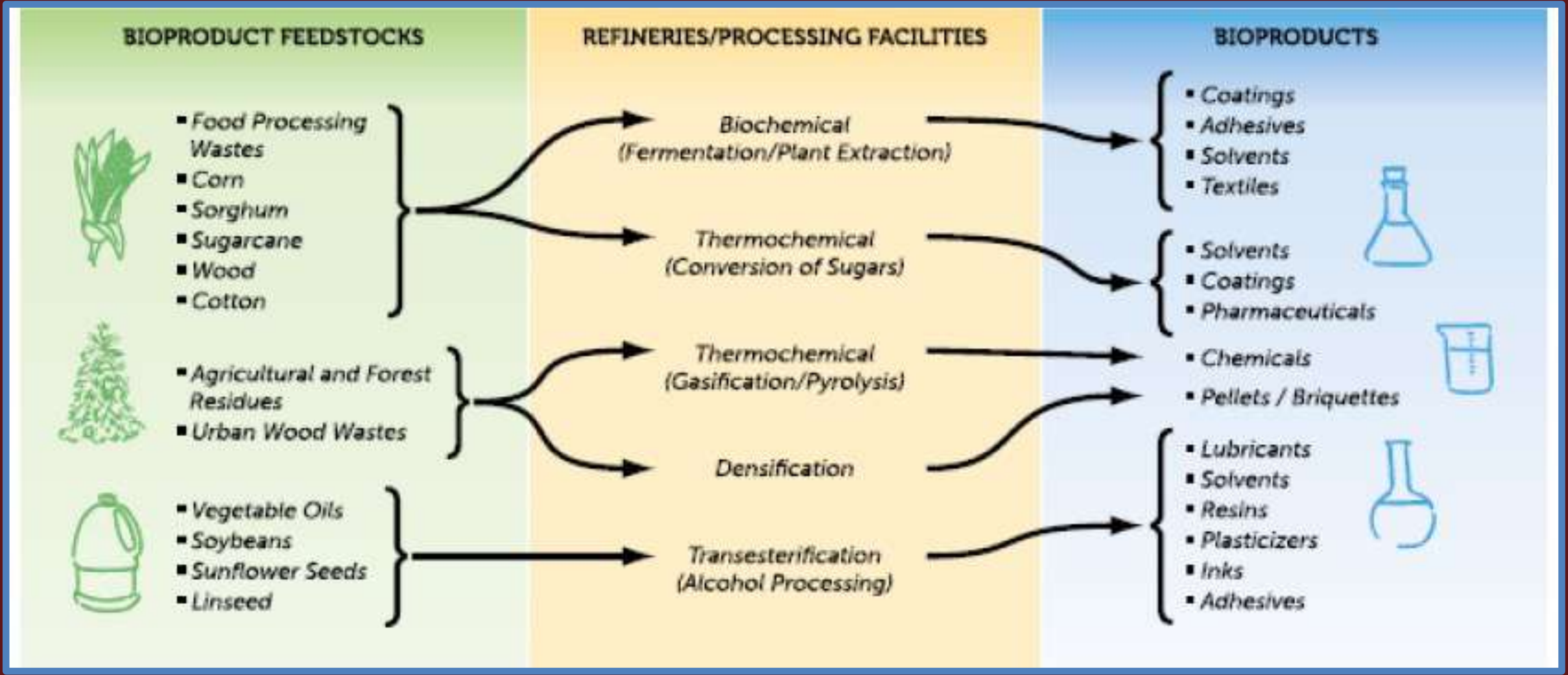
Source: U.S. Environmental Protection Agency (EPA) State Bioenergy Primer (2009)
http://www.epa.gov/statelocalclimate/resources/bioenergy-primer.html

Biomass to Bio Fuel Pathway



Source: U.S. Environmental Protection Agency (EPA) State Bioenergy Primer (2009)
http://www.epa.gov/statelocalclimate/resources/bioenergy-primer.html

Biomass to Bio Products Pathway



Source: U.S. Environmental Protection Agency (EPA) State Bioenergy Primer (2009)
http://www.epa.gov/statelocalclimate/resources/bioenergy-primer.html

Technology Briefing Example: Biomass densification

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Background

- The low-energy density of biomass by volume, in comparison with fossil fuels, results in higher handling, storage and transportation costs. Consequently, biomass is most economically feasible when used close to the source. The cost of biomass transportation is reduced through densification technologies. Densification technologies produce a homogeneous product with a higher energy density than that of the original raw material, at the expense of new capital and operating costs.
- Establishing a "Biomass Densification Industry BDI" is the first step in the Bio-based production chain in which biomass feedstock is converted to bio-based products: **Energy, Chemicals and Materials.**
- A national strategy shall define:
  1. Products & co-products and production technology
  2. Type of biomass feedstock
  3. Supply chain design and logistics
  4. Location of biomass densification facilities
  5. Human resources and technical expertise

Mechanical densification

BALES are a traditional method of densification commonly used to harvest crops. A bale is formed using farm machinery (called a baler) that compresses the chop. Bales can be square, rectangular or round, depending on the type of baler used. The dimensions of round bales range from 1.2 m x 1.5 m (4 ft x 5 ft) to 1.5 m x 1.5 m (5 ft x 5 ft). Large rectangular bales typically measure 0.9 m x 0.9 m x 1.8 m (3 ft x 3 ft x 6 ft) in length. Round bales are less expensive to produce, however, large square bales are usually denser and easier to handle and transport.

PELLETS are very high in density. They are easier to handle than other densified biomass products, since infrastructure for grain handling is used for pellets. Pellets are formed by an extrusion process, using a piston press, where finely ground biomass material is forced through round or square cross-sectional dies and cut to a desired length. The standard shape of a biomass pellet is a cylinder, having a length smaller than 38 mm (1.5 in.) and a diameter around 7 mm (0.3 in.). Although uniform in shape, pellets are easily broken during handling. Different grades of pellets vary in energy and ash content. Photo courtesy of *CanmetENERGY.*

CUBES are larger pellets, usually square in shape. Cubes are less dense than pellets. Cube sizes range from 13–38 mm (0.5–1.5 in.) in cross section, with a length ranging 25–102 mm (1–4 in.). The process involves compressing chopped biomass with a heavy press wheel, followed by forcing the biomass through dies to produce cubes. Photo courtesy of CanmetENERGY.

BRIQUETTES are similar to pellets but differ in size. Briquettes have a diameter of 25 mm (1 in.) or greater and are formed when biomass is punched, using a piston press, into a die under high pressure. Alternatively, a process referred to as screw extrusion can be used. In screw extrusion, the biomass is extruded by a screw through a heated die. Biomass densified through screw extrusion has higher storability and energy density properties compared to biomass produced by piston press. Photo courtesy of Wayne Winkler.

Pyrolysis

TORREFACTION is carried out by heating biomass in an inert atmosphere at temperatures of 280°C–320°C for a few minutes. The torrefied fuel shows improved grindability properties. Torrefied biomass has hydrophobic properties (repels water), making it resistant to biological attack and moisture, thereby facilitating its storage. The process requires little energy input since some of the volatile gases liberated during heating are combusted, generating 80% of the heat required for torrefaction. Torrefied biomass is densified into pellets or briquettes, further increasing the density of the material and improving its hydrophobic properties. Photo courtesy of *CanmetENERGY*.

SLOW PYROLYSIS involves heating biomass to 350°C–500°C in the absence of oxygen and air for extended periods of time (typically 0.5–2 hours). The principal product is a solid (charcoal) that retains 60%–70% of the original energy from the raw biomass. The energy density can be increased, and thus charcoal is a suitable fuel for commercial uses similar to torrified biomass, residential use, i.e., barbecues, and as a potential soil improvement additive known as bio-char. Photo courtesy of *CanmetENERGY*.

FAST PYROLYSIS involves processing biomass at temperatures of up to 450°C–500°C for 1–2 seconds. The process yields up to 75% bio-oil and 10%–15% charcoal. Bio-oil is a higher-energy density fuel, and its handling properties are simplified, as the fuel is a liquid that is pumped and stored in tanks. Precautions are necessary, as bio-oils are very acidic, have a pungent odour and are prone to separation/settling. Substitute bio-oil for fossil fuel, heavy and middle oils. Research is under way to explore conversion to lighter oils such as diesel and gasoline. Photo courtesy of *CanmetENERGY*.

Source: Clarke,S. et al, Ministry of Agriculture, Food and Rural Affairs, Canada, Biomass Densification for Energy Production, June 2011

4. Concluding remarks

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- Recycling rates are influenced by the quality of recovered materials and the economic viability of recycling operations.
- Opportunities for improving may not reside in the already well developed markets (i.e. glass, paper, plastics and cans).
- The real potential lies in unexplored markets for (tyres, e-waste, organic waste, construc8on & demoli8on waste, obsolete cars, etc.)
- Increasingly complex waste streams will therefore rely on more specialized technologies to enable recycling.

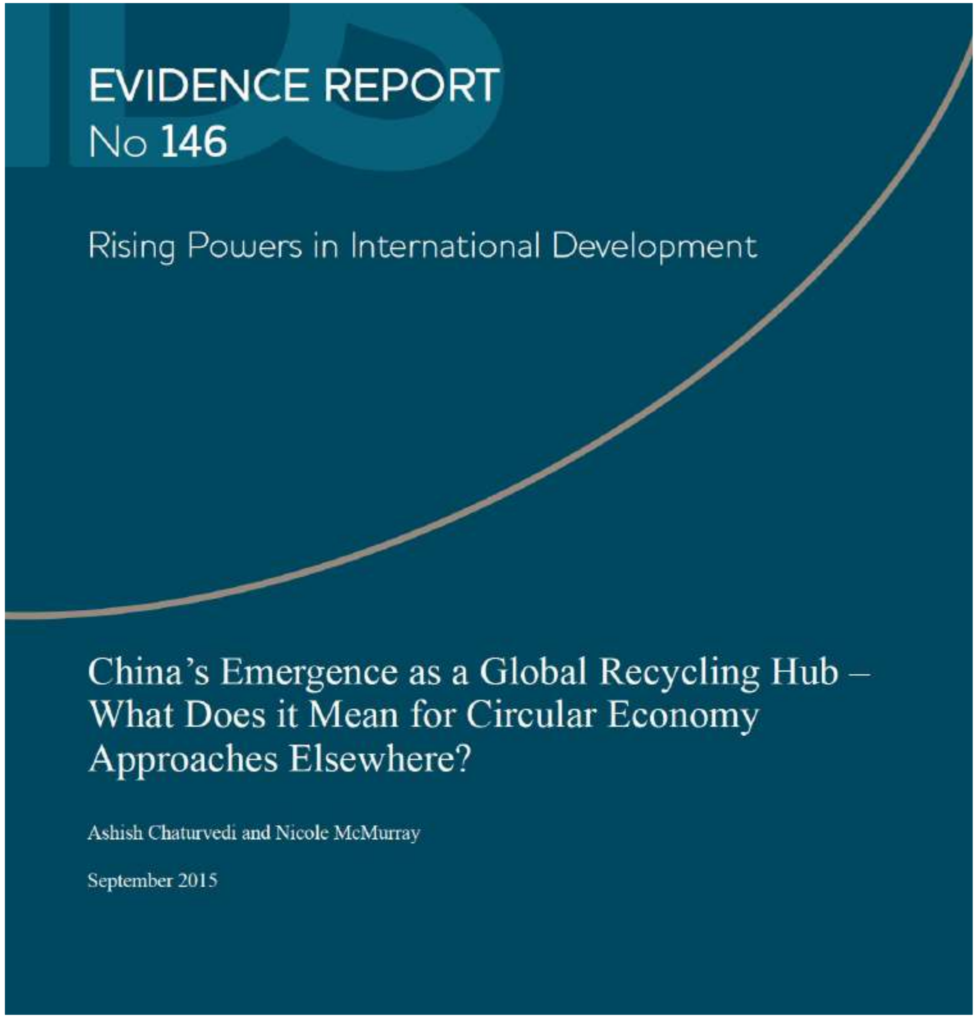
Concluding Remarks cont’d

- We have to understand different systems of “waste classification” and “waste definitions”.
- Like all industries, the recycling industry has its “Best Practices”, “Norms” and “Codes”, “ R&D” and “Occupational Standards”.
- Nations had developed “Regulations” , “Strategies” and” Master Plans” to related to its recycling industry
- Opportunities are tremendous !!!!

A final note on China’s Recycling hub !!

The report aims to bring the attention to China’s rise in importing waste and exporting new products, thus underlining the well-known proposition that waste can be turned into a strategic resource in different countries.

The report examines the effects of China's recycling hub on other countries. It distinguishes between effects that come from the sheer rise in quantity of China imports of recycled materials and effects that come from China raising the quality standards for importing recycled materials. These effects are then examined for developed and developing countries of different types. This differentiated analysis shows that the prospects for building a circular economy can only be understood by incorporating the China-dominated global trade in the analysis. Riding on the growth of recycled materials, countries or regions can build circular domestic loops and create business and employment opportunities, but these are influenced by the configuration of their recycled material trade with China.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Rising Powers in International Development

China’s Emergence as a Global Recycling Hub – What Does it Mean for Circular Economy Approaches Elsewhere?

Ashish Chaturvedi and Nicole McMurray

September 2015

وختاما...تحية واحتراما للمدورين العظام في منشية ناصر ...!!!

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