MATERIAL RESOURCES

The Future

Status Paper, 2021 Edition

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Section 01

Past, Present & Future Of Raw Materials For Development

01 Status: Metals and Materials

Background

As stated by Brian Shmaefsky, in his article on 'The Past, Present and Future of Earths' Natural Resources (2018) : In *The Limits to Growth,* Donatella Meadows, Jorgen Randers, and Dennis Meadows describe an attempt to remediate resource depletion. In 1972, MIT researchers developed a computer program to analyze the aforementioned factors leading to overconsumption. Their analysis is the foundation of models for reducing further resource depletion and even remediating its past effects.

Human population control is a controversial strategy for reducing natural resource depletion. Paul Ehrlich, who popularized this idea in his 1972 book *The Population Bomb*, graphically describes what a resource-depleted world would look like if the rate of growth does not slow before 2050. As discussed in Steven Mosher's *Population Control*, previous attempts at human population control penalized people in developing nations, unintentionally harmed women and particular ethnic groups, and squandered money on ineffective programs.

The environmental sustainability approach to resource management promotes the replacement of nonrenewable natural resources with renewable alternatives. In addition, this approach encourages the reduction, recycling, and reuse of all natural resources. As Douglas Farr describes in *Sustainable Nation*, the sustainability approach attempts to maintain a reasonable standard of living without jeopardizing the needs of future generations. According to the Post Carbon Institute, one shortcoming of the sustainability approach is the enactment of resource quotas and rationing. The resource security approach is similar to the sustainability method of resource conservation. However, some of the resource security strategies promote the extended use of nonrenewable resources not yet exploited, as discussed in Elizabeth Chalecki's *Environmental Security*. In effect, this simply delays resource depletion and does not resolve many environmental pollution issues.

The human population growth is a key factor in resource consumption. In the late 1700s Thomas Malthus held a grim view of the outcomes of natural resource overconsumption. In his article *An Essay on the Principle of Population*, Thomas Malthus recognized that human population growth had to be calculated into supply and demand dynamics. During his time catastrophic events reduced the population when the demand for critical resources outstripped supply.

Many options have been proposed to curb our current degree of resource depletion. A detailed examination of these options requires a separate bibliographic essay. The following paragraphs provide a short overview of the major mainstream strategies for attacking the problem of dwindling minerals and fossil fuels. Unfortunately, the impacts of urbanization on a country's resource consumption were generally overlooked until recently. In *The Routledge Handbook of Urbanization and Global Environmental Change*, editors Karen Seto, William Solecki, and Corrie Griffith present discussions of how global urbanization places extra strain on Earth's natural resources.

This perspective is supported by data from the World Resources Forum (https://www.wrforum.org). The infrastructure needed for urbanization increases a country's reliance on mineral and energy resources, and urbanization raises the per capita resource consumption within these urban areas.

So why do we tend to deplete resources today? Resource overconsumption is partly attributed to the dynamics of supply and demand. If desirable resources are readily available, people will use those resources to the point of exhaustion.

Starting in 2050, it is anticipated that every country's mineral and fossil fuel resources will become more expensive and less available. A decrease in human quality of life will likely result: poorer nations will suffer disproportionately as they are compelled to export their resources as a major source of income. Developing countries are already experiencing the consequences of depleted access to resources.

Based on the projected fate of mineral and fossil fuel resources alone, the next century is looking bleak. According Rob Dietz and Dan O'Neill in *Enough Is Enough*, natural resource depletion primarily occurs in countries focused on economic growth; wealth tends to produce greater per capita resource usage, and prosperous countries have a history of exploiting resources. Their seemingly unhampered access to new natural resources from other regions fuelled a general perception in these countries that natural resources were unlimited; which is wrong….

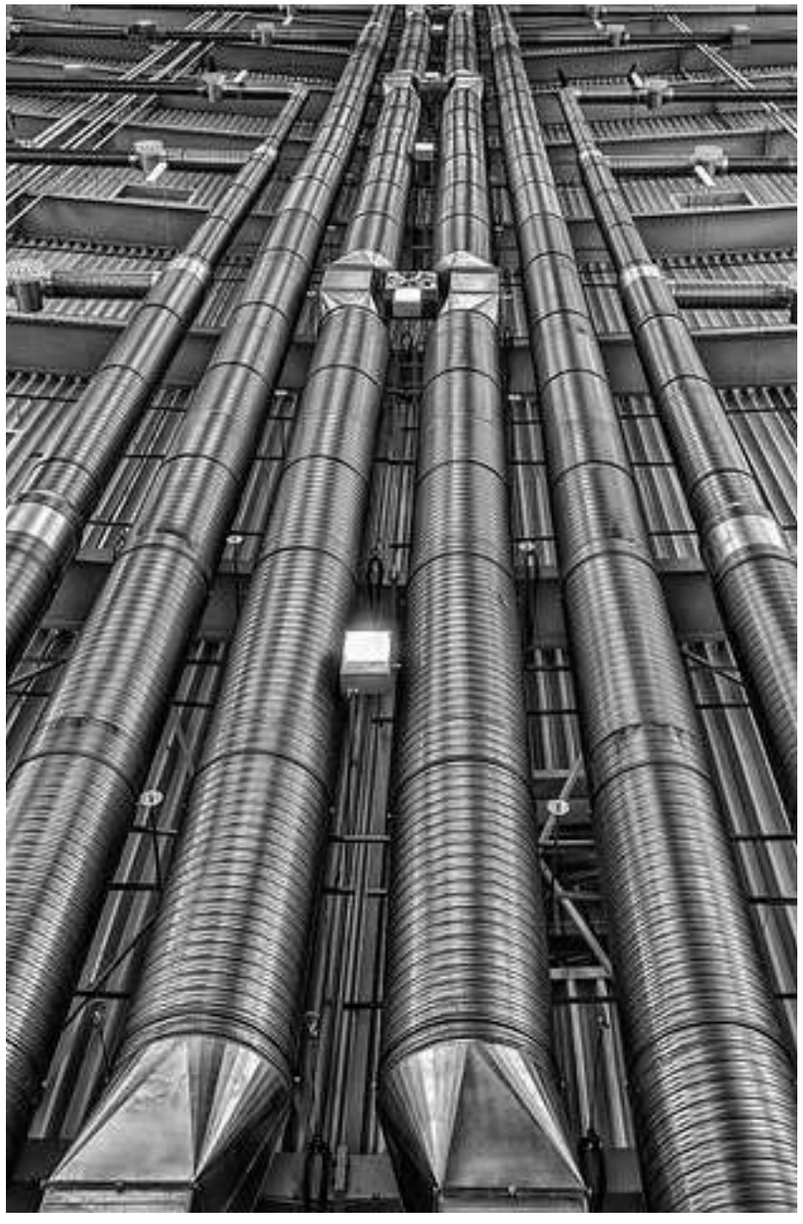
So what should be done in current decade, to enable the sustenance of humanity on this planet?

Today we are well aware that the 'circular economy' - reuse, recycling, resource recovery and reuse of recycled metals and materials is the only answer, (after the use of renewables) for the survival of humanity. For this purpose, there is a need to create an ecosystem to enhance recycling and resource recovery, and connect the various players to leverage this ecosystem, and enable them to use the recycled & recovered resources.

Sanshodhan, India is creating such ecosystem, where businesses and organisations those need (secondary resources) recycled & recovered metals and materials, can join this ecosystem and acquire these resources as raw material for the production of new goods.

02 Secondary Resource Metals and Materials

Electronics & Daily Needs



Industry, Manufacturing, Construction

Automobile, Transportation

Section 02

Secondary Metals and Materials

Market-Place

02 Secondary Metals and Materials : Market-place

Background

Secondary Materials are materials that have been used, recycled and sold for re-use in manufacturing sector. These products allow for less reliance on the search for new raw resources for items such as paper, aluminium and plastic. It is advantageous in the sustainable use of resources so that these materials can be maintained for longer periods.

Use of secondary resources have potential to prevent 50-80% GHG emissions, in comparison to the use of virgin metals and materials. Thus, the use of secondary resources can play a vital role to combat climate change.

The use of secondary materials is not a new concept. Society has used secondary materials as early as 2000 B.C., where bronze was repeatedly reused for weapons, armour and tools. As civilization began to develop, the independent collectors, known as “cartmen,” collected rags, bones and coal dust for reuse in the process of paper, glue and bricks respectively. The practice of using secondary materials became necessary during the First and Second World Wars when resources became strained due to the war effort. Today, the reuse of materials continues to play a significant role in manufacturing and the conservation of our resources by allowing us to enjoy the everyday products that we take for granted.

SOURCE: RESOURCE CENTER, BUSCH SYSTEMS

Secondary material marketplaces are online or brick-and-mortar forums that facilitate the exchange of secondary raw materials. These marketplaces allow secondary material suppliers and buyers to find each other on a web-based platform. The concept evolved out of industrial symbiosis thinking and gained traction with the arrival of the internet in the 1990s.

Less than half of the marketplaces observed today operate as a private organization, meaning most require government or foundational resources to sustain. The privatised marketplaces finance themselves through advertising, memberships, transaction fees, subscriptions and consulting services.

SOURCE: CIRCULAR ECONOMY PRACTITIONER GUIDE

Second-hand marketplaces are places – often online – where people can meet to buy, sell, or trade essentially anything secondary: products that have been pre-used, pre-owned, or remanufactured, or materials that are left-overs or by-products of a production.

Such marketplaces can take many forms. They can be a raw materials trading platform, like MaterialTrader.com, where suppliers of residuals and recycled raw materials meet to trade amongst themselves on the website. Or, they can be a second-hand clothing store, like United Wardrobe, where used (or what the industry likes to call pre-loved) clothing is offered at a discounted price. They can also be a part of a broader online marketplace, such as eBay, which allows vendors to offer both used and new products.

SOURCE: MATERIALTRADER.COM

Section 03

Key Focus Areas: Market-Place

03 Key Focus Areas : Market-place

What's The Future?

	THE GLOBAL ECONOMY WILL QUADRUPLE BY 2060
1	The world has seen strong economic developments in recent decades. Global growth of GDP has been largely driven by fast-growing emerging economies like China and India. The coming decades are expected to bring further shifts in the geographical balance of the global economy. Population growth and income convergence together drive growth of the global economy. The projected increase in population and tripling of global per capita income levels combine to a quadrupling of global GDP. The economic projections are also characterised by changes in the structure of the economy. The main change is the shift of demand from manufacturing and agricultural goods towards services
2	***SOCIOECONOMIC AND TECHNOLOGICAL TRENDS DRIVE FUTURE MATERIALS USE***
	Income Convergence - Strong links between economic growth – and especially convergence in income levels across countries – and investment, infrastructure and construction drive a solid increase in global materials use. As the economies of fast-growing countries mature and develop infrastructure, their use of non-metallic minerals and metals increases strongly.
	Structural Change - The demand for services by firms, government and households, which is projected to increase faster than the demand for agricultural or industrial goods – leads to structural change in the economy. As the services sectors have lower materials intensity (Materials use per unit of output) than agriculture and industry, the global materials intensity of the economy is likely to decrease by 2060.
	Technology Improvements - Technology improvements slow the growth in future materials use despite production growth. These reductions in materials intensity are projected to occur in all major sectors of the economy, albeit at widely varying rates.
	Together, income convergence, structural change and technology developments are projected to lead to a relative decoupling of primary materials use globally.

03 Key Focus Areas : Market-place

3	***MATERIALS USE WILL PARTIALLY DECOUPLE FROM ECONOMIC GROWTH*** According to few research studies, global primary materials use, and thus global primary materials extraction, is projected to double in the coming decades in the central baseline scenario, from 79 GT in 2011 to 167 Gt in 2060. Varying the assumptions about population growth and the rate at which countries catch up in income levels introduces an uncertainty range of around 20% on either side of the central baseline scenario. In all cases, however, global materials use is still projected to grow over time. The materials intensity of the global economy is projected to decrease by 1.3% per year on average, with improvements occurring mostly after 2025 as the economy orients towards more services globally and the construction boom in emerging economies is projected to slow down. Recycling will gradually become more competitive than mining of minerals thanks to projected technological developments and changes in relative prices of production inputs. This leads to growth in the recycling sector outpacing growth in, as well as growth in GDP, albeit less strongly.
4	***MATERIALS EXTRACTION AND USE HAVE SEVERE ENVIRONMENTAL CONSEQUENCES*** The economic activities that drive materials use have a range of environmental consequences. These stem from obtaining the materials (e.g., greenhouse gas emissions from extracting and processing primary materials), from using them (e.g., air pollution caused by burning fossil fuels), and from disposing of them (e.g., pollution of air, land and water from landfilling waste). They also have implications for achieving the Sustainable Development Goals. A large share of greenhouse gas (GHG) emissions is directly or indirectly linked to materials management. These come from the combustion of fossil fuels for energy, from agriculture, from manufacturing, and from construction. The increased extraction and use of materials contributes to a global increase in GHG emissions, even if their contribution to overall emissions is projected to decrease relative to emissions not related to material management. Life-cycle analysis of global extraction and production of seven metals (iron, aluminium, copper, zinc, lead, nickel and manganese) and two construction materials (concrete, and sand and gravel) shows a wide range of environmental consequences linked to materials use, including significant impacts on acidification, climate change, cumulative energy demand, eutrophication, human toxicity, land use, ozone layer depletion, photochemical oxidation, and aquatic and terrestrial ecotoxicity.

03 Key Focus Areas : Market-place

	DIFFERENT MATERIALS REQUIRE TAILORED POLICY RESPONSES
5	Policy priorities should be determined by considering the links between the use of a specific material and its economic drivers, as well as its impacts on the environment and the criticality of its supply. The opportunities for substituting secondary for primary materials are also important in determining policy responses. Macroeconomic indicators of materials productivity cloud the picture and obscure insights into what drives materials use. Countries at different levels of development use different material resources and have different opportunities to decouple materials use from economic growth. The objectives of resource efficiency and circular economy policies are manifold: increasing recycling, increasing the share of secondary resources, reducing waste streams, boosting economic growth, boosting employment, avoiding environmental impacts, et cetera.

SOURCE: GLOBAL MATERIAL RESOURCES OUTLOOK TO 2060, OECD

Section 04

Secondary Resource Market-Place

Case Study

04 Secondary Resource Market-Place Around The World

1. SECONTRADE

Secontrade.com is the first internet-based B2B platform for suppliers and buyers of secondary raw materials from all over Europe. The innovative online platform helps recycling companies and commodity traders to find suitable customers or suppliers and to trade secondary raw materials easily, quickly and safely. Since its launch in January 2018, 140 users from 12 countries registered with SECONTRADE. Recycling material worth 2.3 million euros was processed on secontrade.com in the first eight months. This makes our SECONTRADE platform Europe's largest digital marketplace for secondary raw materials.

SOURCE: SECONTRADE

2. MARKETPLACE HUB

Marketplace Hub is an initiative of the World Business Council for Sustainable Development (WBCSD) to map secondary raw materials markets and industrial synergy networks worldwide. This initiative is centred around a website that enables interested businesses to easily search these markets and networks by location and particular materials. The primary aim of the Hub is to overcome one of the major challenges facing businesses wishing to explore "circular economy" solutions: the lack of information on sourcing or selling their secondary raw materials.

Moreover, Marketplace Hub also aims to foster the further development of secondary raw material marketplaces and the circular economy model in general. This is why, in addition to its general listing of markets and synergies, the website features case studies of particularly successful marketplaces to showcase the potential of secondary raw material markets and to highlight good practices.

SOURCE: EUROPEAN UNION

3. MJUNCTION

In 2001 Tata Steel and the Steel Authority of India Ltd. (SAIL) established a joint venture called Mjunction services limited, which evolved to become the world's largest e-marketplace for steel and India's biggest B2B e-commerce company. Mjunction's mission is to create robust and sustainable supply chains by bringing more efficiency and transparency to stakeholders. Mjunction also offers financing and consulting services to customers while helping many industries and organizations to find the right buyers for these non-core products, while contributing positively to the environment.

They have expanded to include almost 30 waste streams, including hazardous wastes like batteries, e-waste, coal and chemicals and has increased its business volumes from Rs 94.35 crores ($13.8M USD) in 2002 to Rs 134137.68 crores ($10.27B USD) in 2016.

Participating companies save money by utilizing by-products and having access to idle asset identification Both buyers and sellers have increased price transparency through the online platform. For the last five years, Mjunction has facilitated the sales of approximately $900M USD worth of hazardous materials.

Secondary Resource Marketplaces do exist in India but they're unregulated and are not available to all. Mjunction has become the largest e-marketplace for steel. There are no such marketplaces in India, for all secondary resources, accessible to all.

SOURCE: CIRCULAR ECONOMY GUIDE

Section 05

Secondary Resource Markets

Status In India

05 Secondary Resource Markets: Status In India

What Shall Be Done?

India’s secondary materials market has been around for a long time. However, it has largely been ad-hoc and driven by business owners.

Businesses produce large quantities of “non-core” products and by-products because of their normal operations.

Businesses could consider selling these “non-core” products and by-products (i.e. secondary steel, minerals, coal and coal chemicals), obsolete or idle assets, if a market exists. For the market to function efficiently, both buyers and sellers need price transparency, which can be difficult to establish for industrial by-products.

There is a need to establish open secondary resources markets to promote the use of secondary metals and materials, as raw material, to close the loop.

In addition, such, circular economy model will prevent new emissions, resource depletion and damage to our planet.

www.SustainabilityExchange.World

06 References

Global Material Resources Outlook to 2060: Economic Drivers and Environmental Consequences | en | OECD. (n.d.). OECD. Retrieved December 11, 2021, from https://www.oecd.org/env/waste/global-material-resources-outlook-to-2060-9789264307452-en.htm

M. (2020, August 12). How materials marketplaces contribute to the Circular Economy. MaterialTrader.Com. Retrieved December 11, 2021, from https://community.materialtrader.com/how-marketplaces-contribute-to-the-circular-economy/

Offer and demand in secondary raw materials? Make the perfect match on MarketplaceHub | European Circular Economy Stakeholder Platform. (n.d.). European Union. Retrieved December 12, 2021, from https://circulareconomy.europa.eu/platform/en/good-practices/offer-and-demand-secondary-raw-materials-make-perfect-match-marketplacehub

Secondary material marketplaces. (n.d.). Circular Economy Guide. Retrieved December 11, 2021, from https://www.ceguide.org/Strategies-and-examples/Dispose/Secondary-material-marketplaces

What are Secondary Materials? (n.d.). Glossary | Resource Center. Retrieved December 11, 2021, from https://www.buschsystems.com/resource-center/knowledgeBase/glossary/what-are-secondary-materials

Zsifkovits, S. (n.d.). SECONTRADE: Europe's first digital marketplace for secondary raw materials has been a great success. SECONTRADE Blog. Retrieved December 14, 2021, from https://secontrade.com/blog/en/2018/12/05/secontrade-europes-first-digital-marketplace-for-secondary-raw-materials-has-been-a-great-success/

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