China's metal demand and apparent future on sustainability: The case of copper and aluminium

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Urban mining and circular economy are popular concepts used in the development of sustainable metal consumption strategies in China since recent two decades. China produces and consumes a vast number of elements in the periodic table pushing resource demand into unchartered waters. Copper and aluminium are well-known and indispensable major metals in the modern Chinese society and their rapid growing demand is expected to continue without sign on sooner decrease in next three decades. Thus, this study intends to: (1) inspect historical pattern of supply and demand, (2) project demand until 2050, and (3) examine resource sustainability prospects under different recycling rates regarding copper and aluminium in China. Linear regression modeling and scenario analysis were adopted in future projections while using time-series analysis throughout the research. There could be seen rising trends in the copper and aluminium supply and demand from 1950 to 2015 disclosing almost an exponential growth after 2000. Forecasts of the scenario analysis demonstrate that both metal demand will continuously increase between 2015 and 2030, and thereafter, either become stable or decline slightly except at the stable demand growth scenario. Research results indicate that China's current trajectory with regard to copper demand is unsustainable. Recycling is a suitable practice to reduce primary resource consumption which would be more supported to achieve the circular economy; however, it is challenging in application due to high copper use in China which struggles to concern on imports. Furthermore, the results of aluminium encourage increasing the recycling rate approximately at 40-50% which may help China to acquire self- sustaining goal by 2050 regarding aluminium. Inadequacies in discarded product collection and existing policies hinder the progress of internal recycling industry which would be carefully addressed to maintain the future sustainability of copper and aluminium resources in China.

Speaker Biography

Disna Eheliyagoda is currently a doctoral candidate in Environmental Science and Engineering in Tsinghua University, Beijing, China. Her PhD research focuses on "Resource carrying capacity and criticality assessment of copper and aluminium in China." Not only that but she has also published a few articles on investigation of other critical metals, i.e. gallium and nickel, sustainability via end-of-life recycling parallel to her doctoral studies. She obtained her BS (Hons.) in Environmental Sciences and Natural Resources Management majoring Earth and Environmental Sciences at Faculty of Applied Sciences, Sabaragamuwa University of Sri Lanka. While working as a junior researcher with "Chemical and environmental modelling research group" at National Institute of Fundamental Studies, Kandy, Sri Lanka, she completed her BS research on "Characterization of dissolved organic carbon in open dump leachate." After graduation, she joined to International Union for Conservation of Nature and Natural Resources (IUCN) to assist "Mangroves for the Future" project. After one year working period, she started her Master's studies in Environmental Management. She obtained her MS at Faculty of Graduate Studies, University of Colombo, Sri Lanka. While studying as a Master's student, she worked as a consultant in urban waste management which is related to her MS degree and she also performed an assessment in cleaner production and industrial ecology. After MS graduation, she worked as a full-time consultant at Research Unit, the Open University of Sri Lanka and a visiting lecturer in Environmental Studies until joining as a doctoral scholar to School of Environment, Tsinghua University, China in 2017.

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