Clean energy technologies represent a promising solution to the global warming challenge. However, many clean energy technologies depend on some minor metals, and concerns about the demand of the materials have been raised recently. Making the concerns even worse, the materials are usually by-products of base metals, thus the supplies highly rely on the demand and production of the base metals. Indium is one of the minor metals. It is critical for two emerging clean energy applications, that is, copper indium gallium selenide type solar photovoltaic, and light-emitting diode lighting. Like other minor metals, indium is also a by-product of a base metal, mainly zinc. Therefore, demand and supply analysis of indium is essential for the sustainable deployment of the clean energy technologies, which are projected to flourish, because they may either reduce greenhouse gas emission or improve energy efficiency under the severe climate change challenges. In this presentation, sustainable supply planning of the by-product materials, specifically for indium, in multiple perspectives are proposed to suggest a guidance to the stakeholders for the continuous supply of the material, and ultimately to lead the stable deployment of cleaner energy technologies. Finally, my research vision of multi-disciplinary systems analysis by integrating environmental perspective approach to the supply chain of the systems will be shared.

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