

# Stanford

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## Karan Bhuwalka

Research Engineer

Energy Science & Engineering

 Curriculum Vitae available Online

### Bio

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#### BIO

Dr. Karan Bhuwalka leads the materials supply chain modeling at STEER, a research group that conducts rigorous techno-economic analysis to guide investment, innovation, and policy for the energy transition. Karan's research integrates economics, statistics, manufacturing and materials science to identify pathways to sustainably scale-up critical minerals production. Scaling-up energy supply chains rapidly while minimising life-cycle impacts requires aligning technology, markets and policies. STEER takes a systems approach that links engineering process models with supply and demand considerations to inform decision-making under uncertainty. Karan's current work is focused on modeling graphite production. Previous work spans lithium, nickel, recycled plastics systems and Bayesian modeling to reduce uncertainty in material demand.

#### ACADEMIC APPOINTMENTS

- Research Engineer, Energy Science & Engineering

#### PROFESSIONAL EDUCATION

- PhD, Massachusetts Institute of Technology , Mechanical Engineering (2024)
- MS, Massachusetts Institute of Technology , Technology & Policy (2021)
- MS, Massachusetts Institute of Technology , Computer Science (2021)
- BTech, Indian Institute of Technology , Metallurgical Engineering and Materials Science (2018)

#### LINKS

- STEER: [steer.stanford.edu](http://steer.stanford.edu)

### Publications

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#### PUBLICATIONS

- **Understanding key mineral supply chain dynamics using economics-informed material flow analysis and Bayesian optimization** *JOURNAL OF INDUSTRIAL ECOLOGY*  
Ryter, J., Bhuwalka, K., O'Rourke, M., Montanelli, L., Cohen-Tanugi, D., Roth, R., Olivetti, E.  
2024
- **Characterizing the Changes in Material Use due to Vehicle Electrification.** *Environmental science & technology*  
Bhuwalka, K., Field, F. R., De Kleine, R. D., Kim, H. C., Wallington, T. J., Kirchain, R. E.  
2021; 55 (14): 10097-10107
- **Emission impacts of China's solid waste import ban and COVID-19 in the copper supply chain.** *Nature communications*  
Ryter, J., Fu, X., Bhuwalka, K., Roth, R., Olivetti, E. A.  
2021; 12 (1): 3753

## **PRESENTATIONS**

- PhD Thesis: Modeling sustainable mineral supply pathways to meet clean energy demand - Massachusetts Institute of Technology