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Stock-driven scenarios on global material demand: the story of a lifetime

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Propositions with the dissertation “Stock-driven Scenarios on Global Material Demand - The Story of a Lifetime”, Sebastiaan Paul Deetman, defending on December 8th 2021, 10:00

- 1) Waste Electrical and Electronic Equipment (WEEE) is an important source of secondary critical raw materials and should be considered a priority resource to simultaneously promote a more circular economy and increase supply chain resilience. (Chapter 2 & 3)
- 2) National and international statistical offices should put more emphasis on tracking the development of in-use stocks of products and materials. (Chapter 4)
- 3) The global coronavirus pandemic is probably the worst possible time to argue for a lower per capita floorspace use, even though it would lower environmental impacts related to building material demand. (Chapter 5)
- 4) A renewable electricity system is indispensable to a carbon neutral future. Though it presents a trade-off in terms of requirements for many materials, renewable electricity is still a sensible solution from an environmental perspective. (Chapter 6)
- 5) Circular economy measures aimed at extending the lifetime of products make more sense for products with low associated use-phase emissions. This means that the potential synergies between climate policy and circular economy policies are relatively large for electric cars compared to the case of combustion-based vehicles. (Chapter 7)
- 6) Tools from the field of Industrial Ecology and Integrated Assessment are ideally suited to prepare for the ‘age of waste’. Which is possibly a more challenging consequence of continued growth of societal stocks than the ‘illusion of circularity’ as coined by Pauliuk (2018, *Resources, Conservation and Recycling*, vol. 129, p.81).
- 7) Material stocks will play an increasingly important role in climate change mitigation, given that the development of societal stocks based on Western standards may compromise global climate policy targets as suggested by Müller et al. (2013. *Environ. Sci. & Technol.* vol. 47, p. 11739).
- 8) Scenario results should be a starting point for informed discussions and disagreement between models is an opportunity to improve scientific understanding; it is model consensus one should be wary about (after: Saltelli et al., 2020, *Nature* vol. 582, p.484).
- 9) Sustainability goes beyond increasing efficiency, it is about blossoming like a cherry tree (after: McDonough & Braungart, ‘Cradle to Cradle’, 2002). Emphasizing the importance of product lifetimes is not just a call for a sturdy design or a more frugal lifestyle, it can also mean a renewed appreciation of quality and a celebration of craftsmanship.
- 10) Environmental assessment explores environmental karma, but environmental action leads to environmental enlightenment.
- 11) “The most elementary & valuable statement in science, the beginning of wisdom, is ‘I do not know’” – Commander Data, Star Trek, The Next Generation (Season 2, Episode 2); There is much that we do not know about the material foundation of our civilization.