

Are governments misinformed about the cost-benefits of investments in sustainable solutions?

Towards a better understanding of the time value of money *and* environmental indicators

Department: Copernicus Institute of Sustainable Development

Research group: Energy & Resources, Environmental Science

Supervisor: Dr. Jing Hu (ES), Dr. Robert Harmsen (E&R)

Email address: j.hu@uu.nl, r.harmsen@uu.nl

Project description

Reducing energy, greenhouse gas emissions, air polluting emissions, and other environmental waste is the primary objective of environmental policies. Tools, such as environmental cost-benefit analysis and marginal abatement costs curves, have been developed to inform and support policymaking. To rightly inform policymakers, it is key to consider the time value of money. Sustainable solutions which require higher investment costs than their unsustainable alternatives, but lead to costs reduction and avoided societal damages in the future, have problems to be implemented because today's money is valued more than future money. In addition, for environmental target setting, governments and other stakeholders are also interested in the levelized costs of a sustainable solution: how much extra, compared to a reference situation, does one has to pay for the solution per GJ of energy or per ton of CO₂, methane or nitrogen avoided. Here, the existing knowledge base becomes fuzzy. Both in peer-reviewed academic papers and grey literature, various approaches and wording is used with respect to how to consider the time value of the physical environmental indicators (the GJ energy or the ton of emissions). Part of the confusing links to the biophysical impact of emissions: e.g., reducing CO₂ emissions today is more valuable than reducing the same emissions in the future as it helps not to overshoot the carbon budget and not to exceed tipping points. But is this also the way to deal with it in environmental cost-benefit analysis? In this project, the bright mind assistant will carry out a deep literature review to unhide the practices in various branches of environmental studies (e.g., environmental economics, lifecycle analysis, carbon offsetting and sequestration). The aim of the project is a joint academic paper in which the literature review is synthesized into a transparent guideline for environmental cost-benefit analysis.

Job requirements

We are looking for a student with a strong interest in research methods & theory. Background knowledge in net present value (NPV), levelized costs of energy (LCOE), marginal abatement costs curves (MACCs), real & nominal values is a prerequisite