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A formula for time valuing CO_2 emissions from buildings

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It is argued that substantial reductions of both operational and embodied CO_2 emissions from new buildings are required to help meet climate change objectives.Although it is generally reported that total operational emissions over the lifetime of a building are greater than embodied emissions, they are built up of relatively low annual emissions, typically occurring over anything between 30 and 120 years, whereas the majority of embodied emissions occur at the start of a building's life during the production of materials and components and building construction. Thus building emissions, and in some cases absorptions, as with sequestered CO_2 during the production of biogenic materials such as wood, occur at various times throughout the building life cycle. Therefore, an important issue that needs to be addressed is the time value of these emissions, in other words do emissions that occur now have the same global warming impact as emissions that occur in the future. Or conversely, are emissions avoided now more beneficial than emissions avoided in the future.If emissions can be time valued, it can help decision making when it comes to comparing mitigation measures which have benefits that occur at different times. A formula for time valuing CO_2 emissions is developed, which can be used to compare the impact of options such as building construction using low impact construction materials but with relatively high operational impact and building construction using high impact construction materials but with relatively low operational impact.

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