Nitrogen mineralisation and greenhouse gas emission from the soil application of sludge from reed bed mineralisation systems

A sludge treatment reed bed system (STRB) is a technology used for dewatering and stabilising sewage sludge via assisted biological mineralisation, which creates a sludge residue suitable for use as fertiliser on agricultural land. We evaluated the effect of sludge residue storage time (stabilisation time) for three STRBs on soil N mineralisation and CO2 and N2O emissions in soil. The experiment revealed that the N mineralisation rate and emissions of CO2 and N2O decreased as a function of treatment time in the STRBs. Mixed sludge residue (sludge residue subjected to different treatment times) for the three STRBs resulted in N mineralisation rates similar to the sludge residue subjected to a shorter treatment time but lower N2O emissions similar to the values of the older sludge residue. This finding reveals that combining fresh and more stabilised sludge residue ensures high N availability and reduces N2O emissions when applied to land.
On-road electric vehicle recharging infrastructure is essential in the transformation of electric vehicles into a practical transportation option. This study focuses upon assessing the need for recharging infrastructure for long distance travel for a large market share of electric vehicles, finding the optimal infrastructure deployment, and understanding the economic, social and environmental costs and benefits associated with the optimal infrastructure deployment. The analysis considers quick-charging and battery-switching as plausible recharging technologies. Results show: (i) the promotion of electric vehicles is beneficial when considering economic costs and benefits for operators and users, tax redistribution, and environmental externalities, even with a relatively modest market share; (ii) the number of required recharging stations for satisfaction of the travel demand is at the magnitude of 1–2% of the current gasoline infrastructure, under the assumption of wide availability of off-road recharging at home and the workplace; (iii) the optimal deployment of the recharging stations is along the main national highways outside of urban conurbations, under the assumption of wide availability of home recharging; (iv) the battery-switching technology is far more attractive to the consumer than the quick-charging technology for long-distance travel requiring more than one recharging visit.
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Håkan Vigre (Organizer)
Pernille Hammar Andersson (Organizer)
Sofie Katrine Lorentzen (Organizer)

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