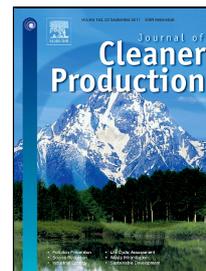


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Integration and consolidation in air freight shipment planning: An economic and environmental perspective



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1 **Integration and consolidation in air freight shipment planning:**

2 **An economic and environmental perspective**

3 4 **Abstract**

5 Measuring carbon footprint and controlling carbon emissions across a supply
6 chain have gained considerable attention. This study investigates the effects of carbon
7 emissions within the framework of air freight integrator shipment planning, with
8 integration and consolidation. A mixed 0–1 Linear Programming (LP) model is
9 formulated to examine the effects of operational adjustments on carbon emissions and
10 cost performance, as well as the effects of carbon emissions regulations on
11 operational decisions. Sensitivity analysis is performed to examine different carbon
12 emissions policies and operational environments. Reducing carbon emissions through
13 operational adjustments is feasible at the expense of some increase in cost. Thus,
14 reducing carbon emissions may be considered an alternative or a supplement to more
15 costly carbon-reducing technologies. Policies implemented to control carbon
16 emissions can affect operational decisions when carbon tax/price is high enough.

17
18 **Key words:** integration, consolidation, carbon emissions, environmental policy

19 20 21 22 23 24 **Nomenclature**

CO	carbon monoxide
CO ₂	carbon dioxide
EU-ETS	European Union's emission trading scheme
GHGs	greenhouse gases

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