How do sea ports reduce air emissions from maritime supply chains?

Explaining sea ports' choices of air emission reduction tools

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The puzzle

Environmental governance and port stakeholder management literatures show evidence that ports engage in voluntary environmental action/air emission reduction to protect their social licences to operate (Fenton 2016; Giuliano and Linder 2013; Santos et al. 2016; Dooms et al. 2004; De Langen 2007)

but

Maritime energy efficiency literature shows evidence of maritime energy efficiency gaps caused by inefficient port operations (Johnson and Styhre 2015; Eide et al. 2011; Gibbs et al. 2014; Moon and Woo 2014).

Research questions

1. How do leading seaports voluntarily reduce air emissions from maritime supply chains?
2. Why are some air emission reduction tools uncommon in frontrunner ports, while other tools are common?

Global frontrunner ports: Los Angeles, Vancouver, Rotterdam, Antwerp and Hamburg

Environmental footprint

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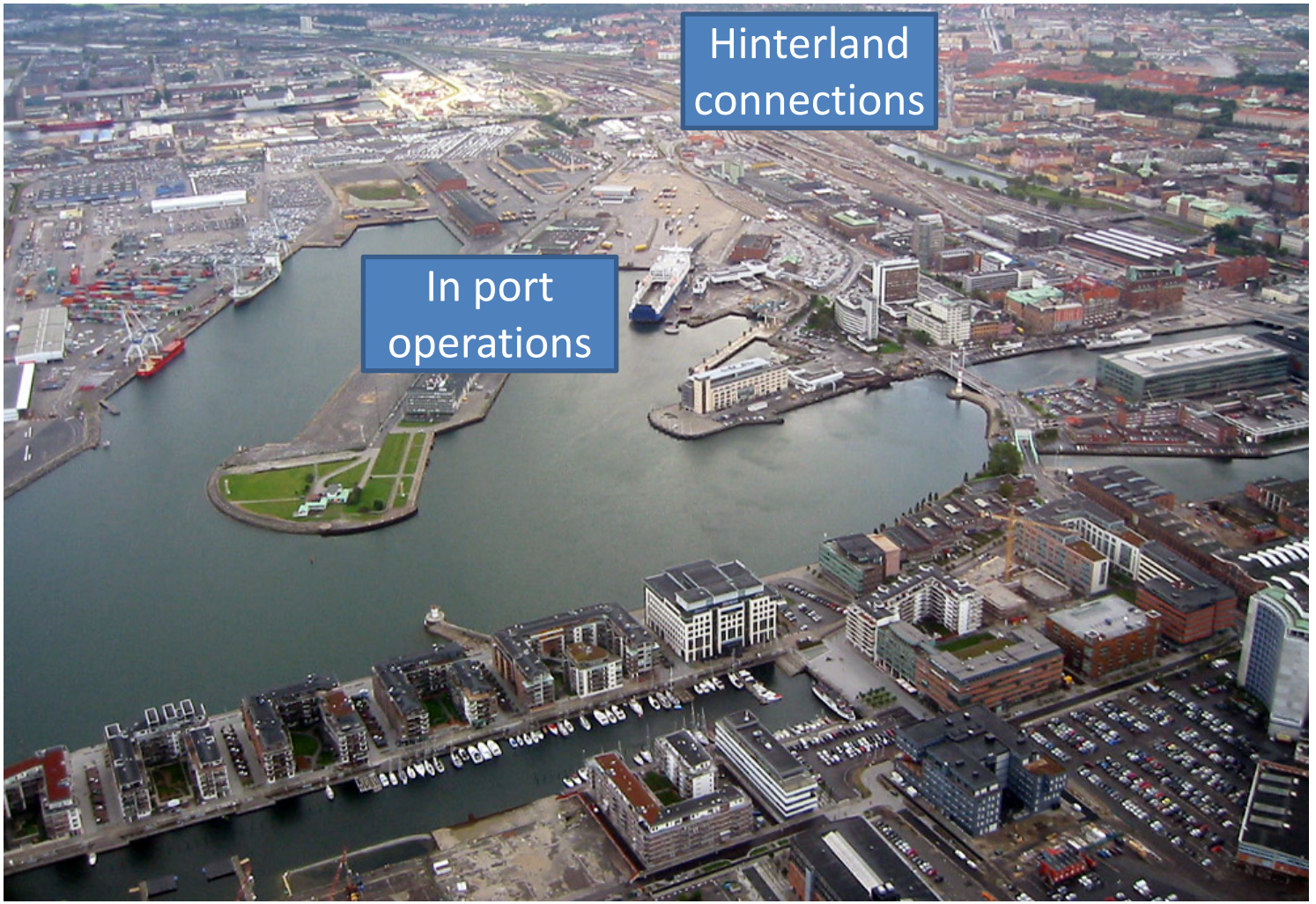
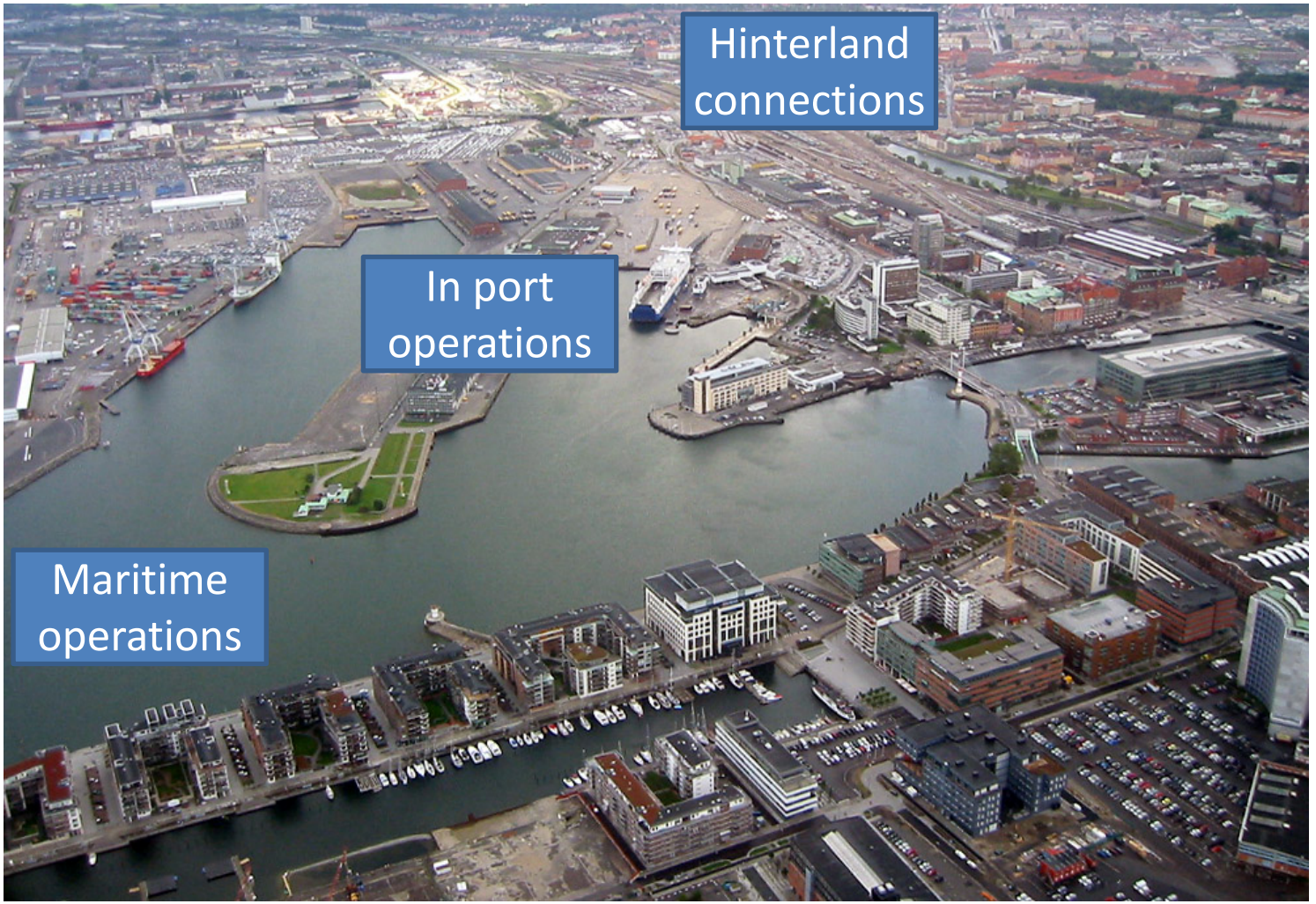


Environmental footprint



Results

Sources: Recent sustainability reports for the five ports; Lloyd's List (various years)

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		Low	High

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EMISSION VISIBILITY	Low		• Virtual arrival (uncommon)
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Conclusion and implications

Ports focus on scope 1-2 air emissions, but neglect more significant scope 3 air

- Scope 3 is out of sight and out of mind

Tool complexity and emission visibility influence port emission initiatives

- The higher the complexity, the lower the adoption
- The lower the emission visibility, the lower the adoption

Implications for ports:

- Ports hold a potential for further air emissions reduction
- Coordination of green port incentive schemes can strengthen incentives for ship-owners to further engage in voluntary environmental action
- Coordination of virtual arrival schemes can improve port efficiency, maritime energy efficiency and lead to further air emissions reductions
- Ports have a collaborative infrastructure available with the World Port Climate Initiative, which can be used to implement these improvements