

WASTEWATER RECEPTION FACILITIES AT PORT OF HELSINKI

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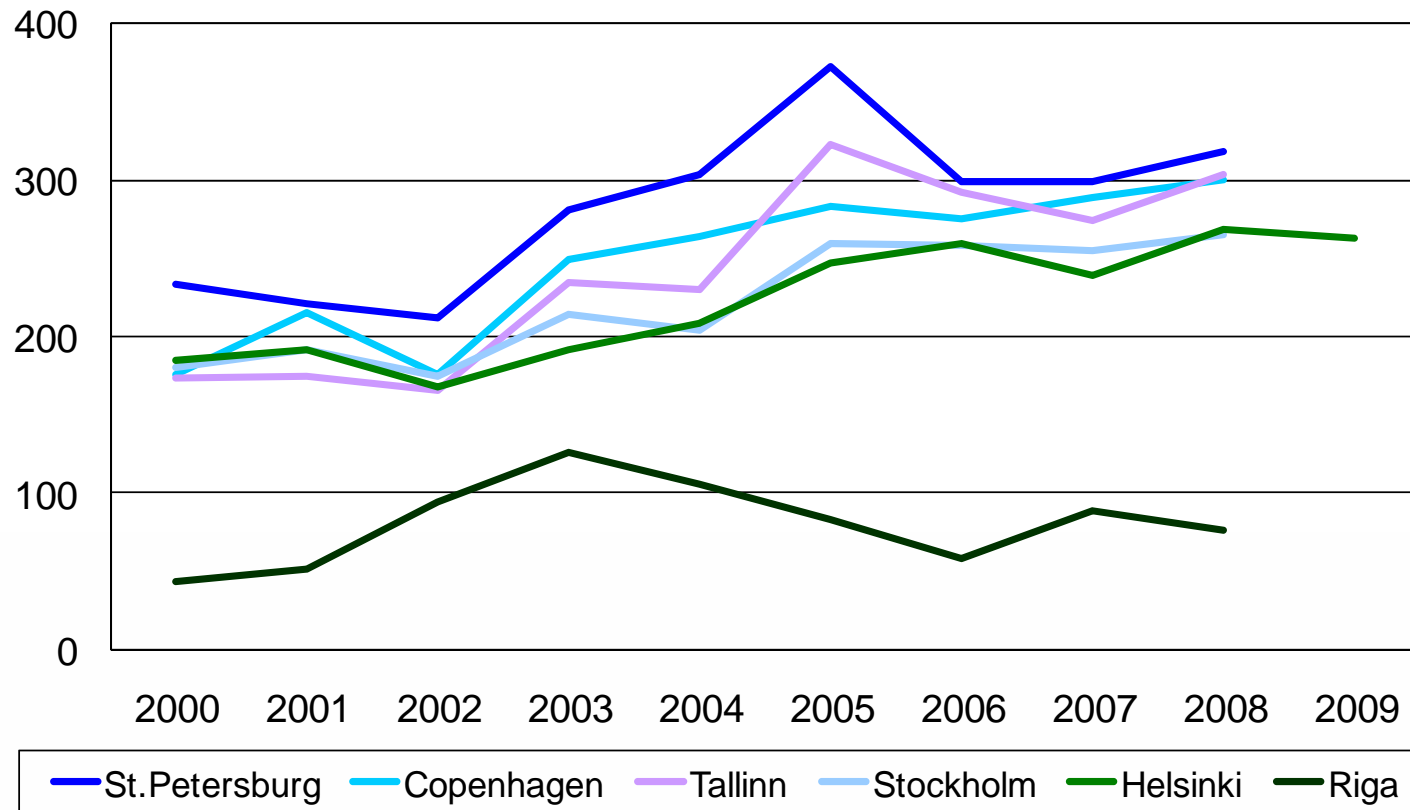
Traffic in 2009

- Finland's biggest general port
 - Total traffic 9.8 Million tons
- Leading unitised cargo port
 - Unitised cargo 8.6 Million tons
 - Import 4.4 Million tons
 - Export 4.2 Million tons
- Leading passenger port
 - Liner traffic 9.0 Million passengers
 - Cruise vessels 0.36 Million passengers

Logistic Zone and Hinterland Connections



Cruise Vessel Calls in the Baltic

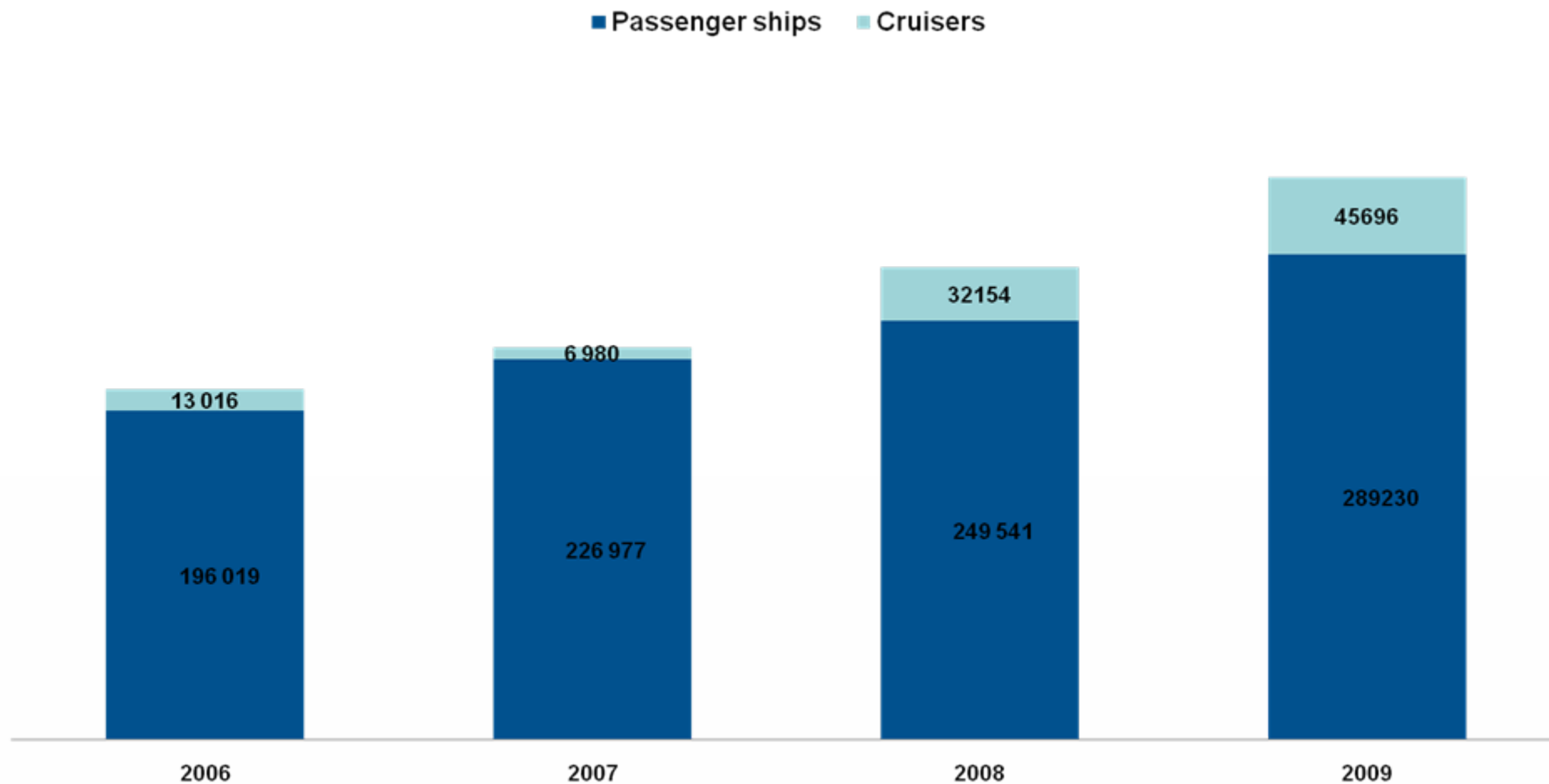


Wastewater reception facilities in Helsinki

- Started in 1997 in South Harbour (Silja Line)
- Next Viking Line
- => problems with smell while pumping wastewater to the sewage
- => pretreatment in the ship

- Now all berths (ferries, cargo vessels and cruise vessels) have reception facilities
- Vuosaari cargo harbour has a treatment unit for ship generated wastewater (possibilities for aeration or chemical treatment) as well as measurement instruments

Total received wastewater



Cruise Terminal

Receiving Black and Grey Water



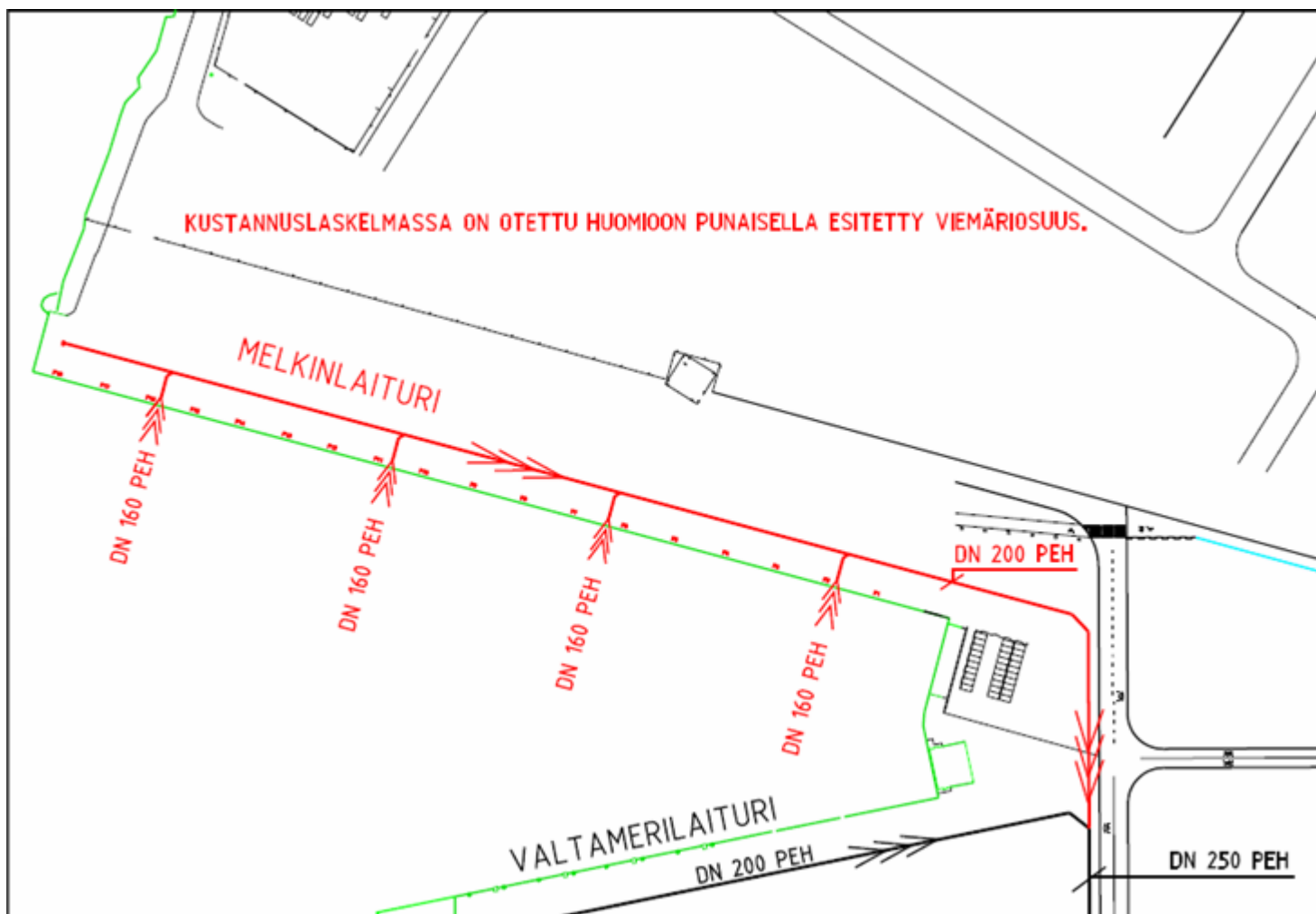
Welcome to the Port of Helsinki



New berth in West Harbour and connection point



Technical arrangements for the new cruise berth in West Harbour



Costs of the wastewater facilities in the new cruise berth 2009 (450 m)

Excavation	31 000 Euro
Using of trucks	31 000 Euro
Backfilling	22 500 Euro
New asphalt	32 000 Euro
Employees salaries (Port of Helsinki)	21 000 Euro
Piping material and fittings	33 500 Euro
Installation cost for piping	9 000 Euro
Canopy for connection points	8 500 Euro
Planning for electrical heating	3 000 Euro
Electrical heating installation	8 000 Euro
TOTAL	199 500 Euro

Challenges

- Smell (challenge for piping system and ventilation), Ferries in South Harbour must use pretreatment
- Permeate, bio sludge or fats may block the piping system and back flush valves, are they waste water?
- Cruise vessels has invested money for their own treatment plants
- The capacity of sewage system is 100 m³/hour, is it enough?