



GREENPORT
Alliances



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Sustainable Maritime Operations and Green Port Technologies

Module number 6

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Recap and reflections

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Key points

- Sustainability matters in maritime and port operations - small operational changes produce big impact on emissions and costs.
- Safety remains the top priority – sustainability must complement, not compromise navigation safety
- Behavioural change through the COM-B framework: Capability (having the knowledge and skills to operate efficiently), Opportunity (having the right tools, systems, and conditions that enable sustainable practices), Motivation (the willingness to act, driven by client expectations and the benefits of efficiency).

Emission reduction theory & regulations

The transition towards sustainable maritime operations is influenced by international and regional regulatory frameworks.

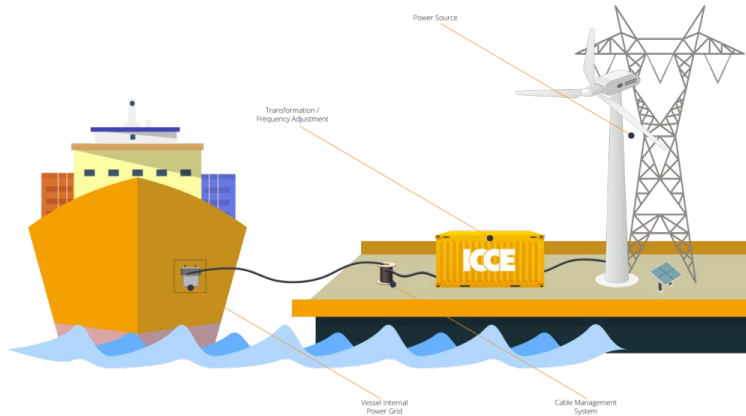
- Global and EU frameworks are shaping expectations (Green Deal, Fit for 55, FuelEU, EU ETS, IMO NZF)
- Port service vessels may not be directly regulated, but clients are
- Practical measures: Onshore Power Supply (OPS), hybrid/electric tugs, Just-in-Time arrivals.



Source:
<https://www.dnv.com/maritime/insights/topics/fueleu-maritime/>

Even if we are not directly targeted, the ripple effect of these regulations influences the way we work and the clients we serve.

Technology and innovation in ports



Source: <https://icce.com/2024/07/30/onshore-power-supply/>

- ❑ Industry transformation through decarbonisation and innovation
- ❑ New solutions: OPS, Shaft Power Limitation (SHaPoLi/EPL), emission monitoring
- ❑ Alternative fuels: LNG, methanol, ammonia, hydrogen, HVO
- ❑ Challenges: high costs, limited availability, infrastructure gaps

Technology provides opportunities but also challenges; progress depends on combining innovation with practical adjustments in daily routines.

Operational strategies

- ❑ **Eco-speed steaming** – reduced approach speed = lower fuel use
- ❑ **Tidal window scheduling** – optimise manoeuvres with current and tide
- ❑ **Real-time fuel monitoring** & visualization
- ❑ **Data-driven behavioural** change & feedback loops
- ❑ **Optimised tug use** before/after operations.
- ❑ **Improved vessel scheduling** to avoid multiple pilot boat and tug trips.

Stakeholder engagement & communication

- ❑ **Sustainability** relies on cooperation and communication
- ❑ **Key actors:** pilots, tug masters, terminal operators, port authorities, shipowners
- ❑ **Leadership and peer influence** encourage sustainable behaviour
- ❑ **Digital tools** support decision-making but don't replace human judgement
- ❑ **Cybersecurity** and responsible use are critical.

Technology helps, but human collaboration and leadership are what truly drive sustainable change.

Reflection & Discussion



- ☐ Which of today's strategies (operational, technological, behavioural) seem most applicable in your local port operations?
- ☐ What barriers (infrastructure, cost, culture) may you face?
- ☐ How can we balance safety of navigation with efficiency and sustainability goals?
- ☐ What role does personal leadership (pilots, tug masters, supervisors) play in accelerating the green transition?
- ☐ From the examples discussed (Rotterdam, Gothenburg, Antwerp, Los Angeles), which practices could realistically be adapted to your port?



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