

Factors of hybrid sailing re-emergence in the transition to a low carbon economy



Introduction : We investigate the conditions of the “re-transition” from steamships to (hybrid) sailing technologies (including kites, flettner rotors, turbo sails...) through a systems approach in a carbon constrained economy

1 A need for radical innovations to reduce shipping sector's global and local emissions

Approved International Maritime Organization regulations :

- By 2015, fuel sulfur content reduced from 0.5 to 0.1 % in ECA (Emission Control Area : Baltic Sea, North Sea, North American area and US Caribbean sea)
- By 2020, fuel sulfur content reduced from 3.5 to 0.5 % outside ECA

NOx and PM emissions under discussion

- ⇒ Short sighted approaches to the problem limited to alternative fuel or scrubbing
- ⇒ Very few voices calling for seizing the opportunity to **explore co-benefits of sulfur AND carbon reduction**

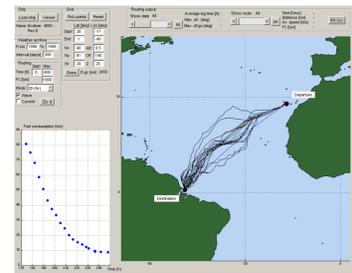
If global economic growth continues at the current rate, emissions from Marine industry are set to rise of nearly 200% by 2050

How to radically cut ship carbon intensity ?

- new ship efficiency standards (the EEDI)
- much greater penetration of technologies and operational practices

⇒ Cut in half by 2035-2040

⇒ more step-change forms of propulsion such as wind, battery and biofuels, combined with new logistical schemes, should be introduced from the outset to achieve maximum reduction of carbon emissions



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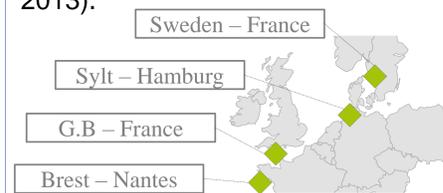
DYKSTRA

4 Develop on existing niches... or wait for future markets ?

Empirical observations and pilot projects help in the assessment of the conditions (social, political, economic, geographical,...) for new business models and markets.

- Short Sea Shipping in NSR to compete with trucks

We analyzed the peculiarities of WASP transport niches that released possible barriers to their development and make them exist (Jaouannet & Rynkiewicz, 2013).



- New markets

- Decline in fossil fuel markets in radical low carbon transitions
- Increases in biomass related trade for ex.
- ...

- Isolated islands (Greenheart Project and transport for islands in South Pacific)



- Long distance shipping
Use of traditional routes with high wind potentials to offer low carbon products that match demand.

- What to expect from labelling?

Transport is the third sector after Energy and Primary industry contributing to the global French energy footprint (Energy used in the world to satisfy French consumption by sectors, Les Cahiers du Clip n° 22)



2 Reinforce functions of the innovation system to further develop Hybrid Freight Sailing

Key structural elements surrounding the technology are actors, networks and institutions. The functions of the Hybrid Freight Sailing innovation system need to be reinforced (Rojon & Dieperink, 2014).

We particularly focus on sharing plausible assumptions on:

• Energy costs and carbon price

Escalating energy costs and a real price for carbon (>100eur/tCO2) would favour Wind Assisted Sailing Propulsion (WASP) options. A real question is how to incentivise replacement of existing ships and low carbon retrofitting.

• Associated infrastructures

Particular interest for port infrastructure and multimodal logistics.

We also investigate specific needs related to availability of (bio)gas or LNG.

• The role of maritime low carbon regions

- Energy futures and marine technology development
- Low carbon infrastructure and territories development

⇒ diversification challenge and call for innovation strategies

⇒ who are the movers and who will be the first welcome sailing ships and maintenance firms ?

• Policies supporting diversity

From an evolutionary economics perspective, one policy objective, is to actively support the diversity of available knowledge to reduce the risk of infrastructure lock-in and prevent the lock-out of technologies that can meaningfully reduce absolute emissions from the sector (Gilbert, 2013 ; Van den Bergh, et al., 2006).

⇒ Will we see the survival of the greenest ?

3 Question change of freight demand in Low Carbon shipping Scenarios to meet the 2°C goal



The analysis of low carbon shipping scenarios shows an increase in shipping emissions of 200 to 400% within 2050 compared to 1990.

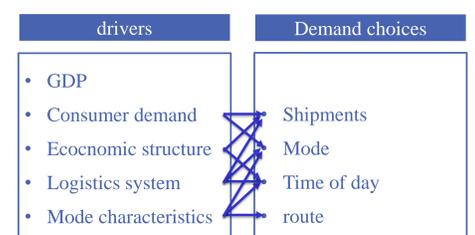
Having a 50:50 chance to avoid a 2°C increase, would require a 80% reduction in emissions in all sectors of the economy



NIES (LCS 2050) for Japan scenario

⇒ Need to investigate the evolution of freight demand

- Energy trade ?
- Food trades between low carbon regions ?
- Intermodal transport
- New supply chains
- ...



Drivers of Freight Transport Demand. (van de Riet, de Jong and Walker 2008)

S@IL project www.nrsr.sail.eu

The SAIL project is an Interreg IVB North Sea Region Project with 17 partners from 7 countries around the North Sea. The project's aim is to develop and test hybrid sailing concepts that lead to new business opportunities and a more sustainable future. The project partners are exploring the possibilities offered by alternative propulsion to renew the freight sailing industry. Those concepts have high potentials, due to rising oil prices and environmental aspects.

European Union The European Regional Development Fund

The Interreg IVB North Sea Region Programme

Investing in the future by working together for a sustainable and competitive region



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E&E is leading activities within the SAIL project to elaborate a HFS technological roadmap until 2050.

Poster for the Tyndall "Radical Emission Reduction Conference", 10th - 12th December 2013, Royal Society, London

