MESA

Maritime Europe Strategy Action

TTG 1 – Energy Efficiency Workshop,

Brussels, 5 March 2014

MESA – AUXILIARY RENEWABLE ENERGY

Introduction

- Auxiliary energy refers to energy not used for main propulsion
- Main forms of auxiliary energy needed onboard:
  - Electrical
  - Thermal
- Motivation to use renewable energy:
  - Environmental concern and regulations, fuel price
  - Less power needed than for propulsion make alternative sources of energy possible candidate
- Multiple (intermittent) energy sources onboard will require suitable power management system

Technology Breakdown

4.1 Solar energy	4.1.1 Electricity production / Photovoltaic cells
	4.1.2 Heat production
4.2 Wind energy (not for propulsion)	4.2.1 Electricity production / Wind turbines
4.3 Seaway	4.3.1 Electrical production from water flow / Hydrogenerator, tunnel turbine
	4.3.2 Energy production from ship motions / Gyroscopic effects, pendulum
	4.3.3 Energy production from ship relative motions / fins, foils, motions between ship parts on waves
4.4 Waste	4.4.1 Production of synthetic gas
4.5 Energy storage	4.5.1 Battery
	4.5.2 Supercapacitor
	4.5.3 Flywheel
	4.5.4 Hydrogen

4.1 Solar energy

- Electricity production
  - Photovoltaic cells
  - Low efficiency (~15%)
  - Intermittent
  - Complementary source

Fondation Océan Vital


Eco Marine Power

- Heat production

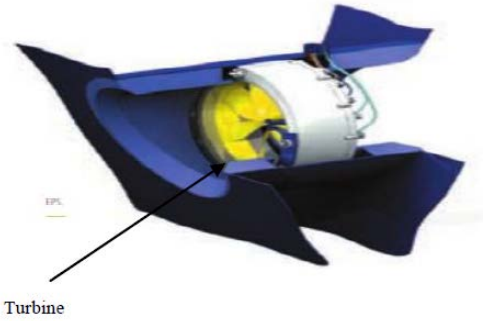

Wallenius Wilhelmsen

4.2 Wind energy

- Wind turbines; Stena example
  - Installed on deck
  - 7 m tall
  - 23000 kWh / year
  - 10% reduction of aerodynamic resistance claimed

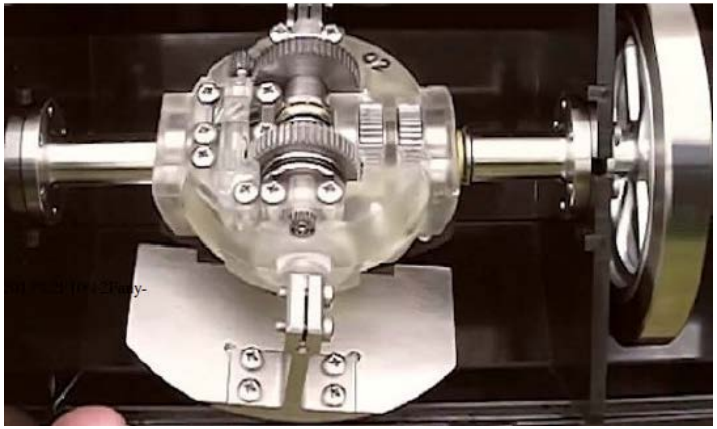
4.3 Seaway

- Electricity production from water flow
  - Hydrogenerator, tunnel turbine
  - Studies of use in conjunction with wind propulsion



4.3 Seaway

- Electricity production from ship motions
  - Kinetic energy recovery:
    - Gyroscopic effect
    - Linear oscillator
    - Pendulum

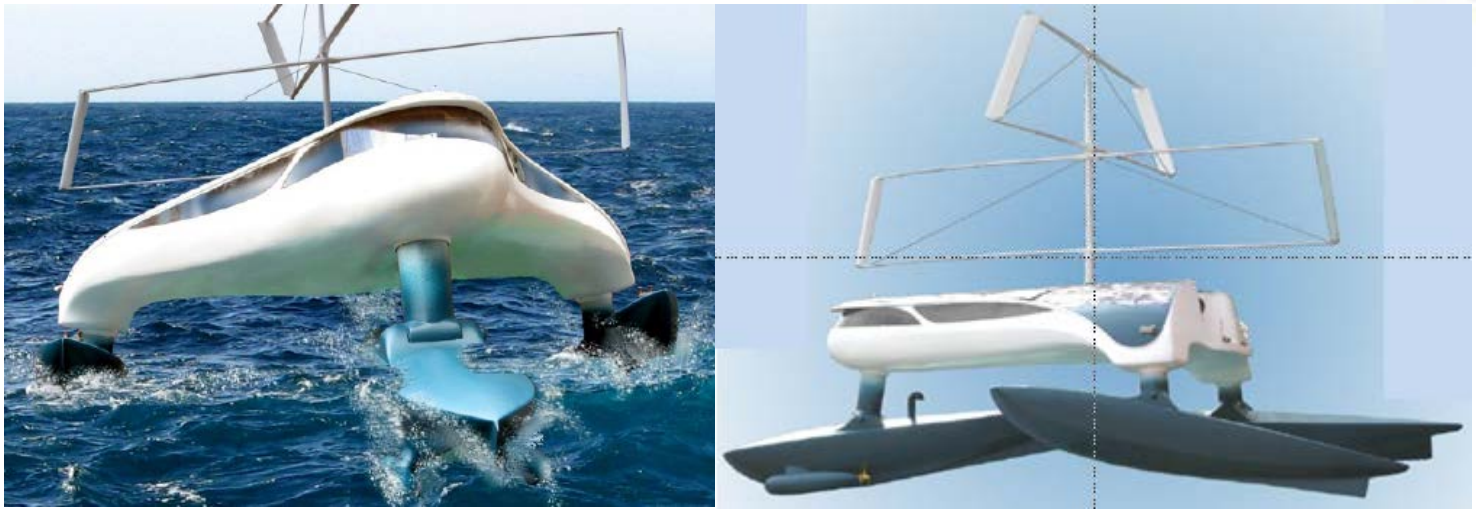


WITT Energy Ltd

EU SEAKERS

4.3 Seaway

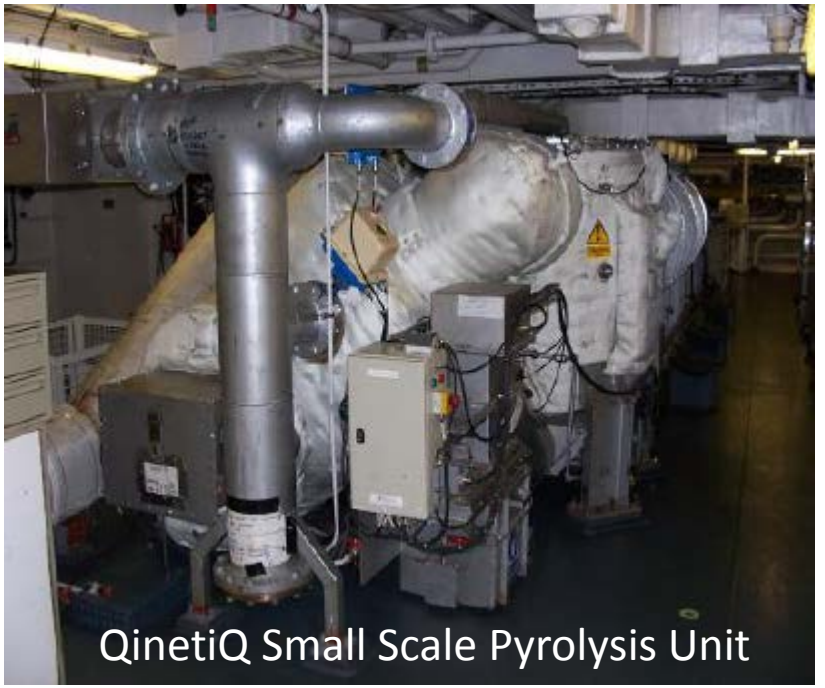
- Electricity production from relative ship motions
  - Loads exerted on fins or foils
  - Internal loads with articulated parts



Eco-trimaran, J. Sommer

4.4 Waste

- Synthetic gas production from onboard waste
  - Pyrolysis + gasification
  - Wet oxidation
- Direct heat recovery
- Electricity production (genset)


QinetiQ Small Scale Pyrolysis Unit

4.5 Renewable energy storage

- Intermittent energy (day/night, wind, waves) requires storage
- Storage as electrical energy
  - Batteries
  - Supercapacitor
- Storage as mechanical (kinetic) energy
  - Flywheel
- Storage as chemical energy
  - Hydrogen

Relevant EU Projects
(identified so far)

- POSE²IDON
- BESST
- SEAKERS
- JOULES

Summary

- Various alternative energies for onboard auxiliary needs identified;
- However, most technologies are in conceptual phases with low TRL,
- With few studies or projects performed and very limited descriptions or results available
- All (your) inputs are most welcome

Thank you for your attention