

EURO-MEDITERRANEAN INTEGRATION FOR FINANCING INFRASTRUCTURE, ENERGY AND SUSTAINABILITY: THE CASE OF LNG USE IN MARITIME TRANSPORT

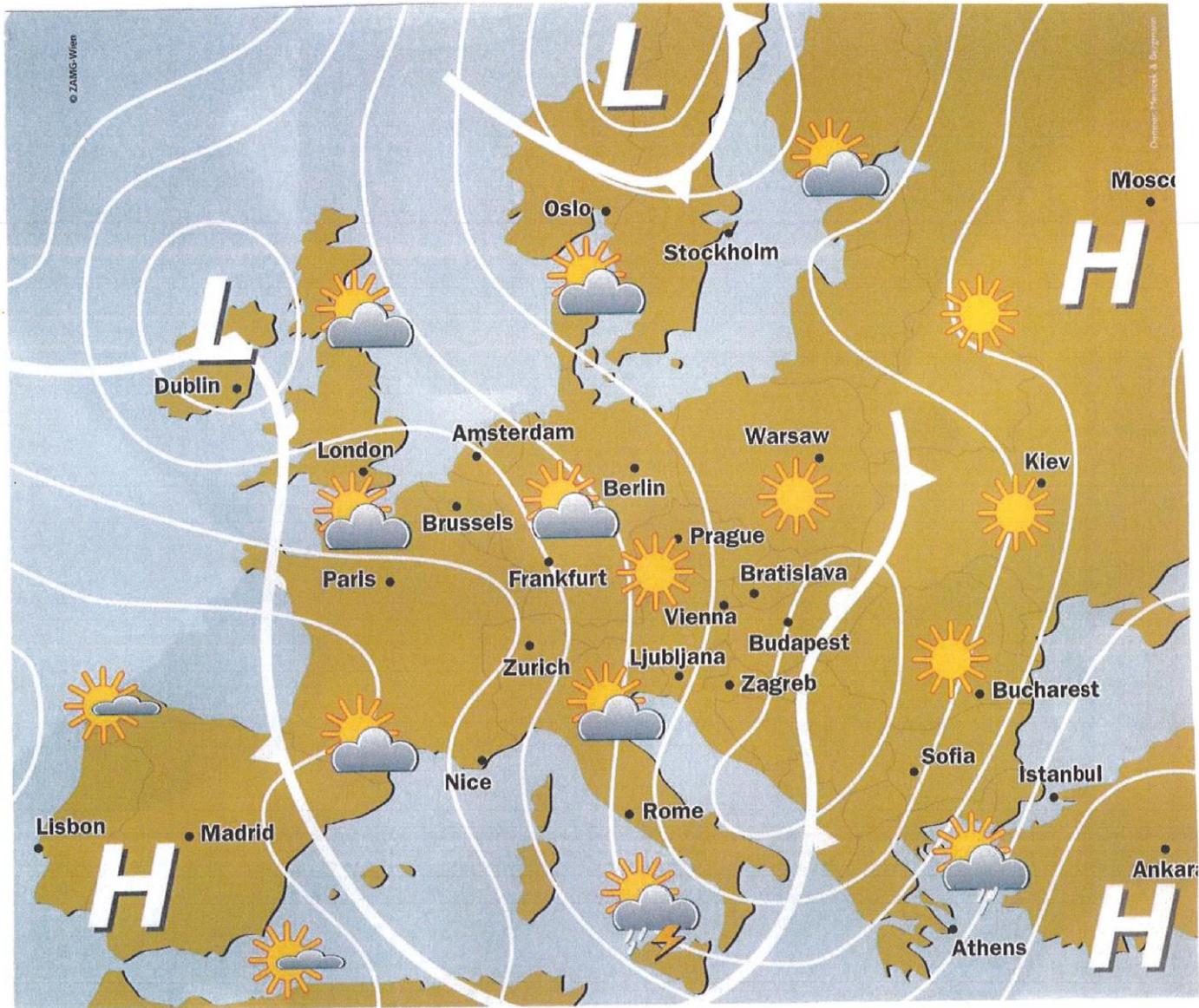
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**The FeBAF Euromediterranean Investment Forum
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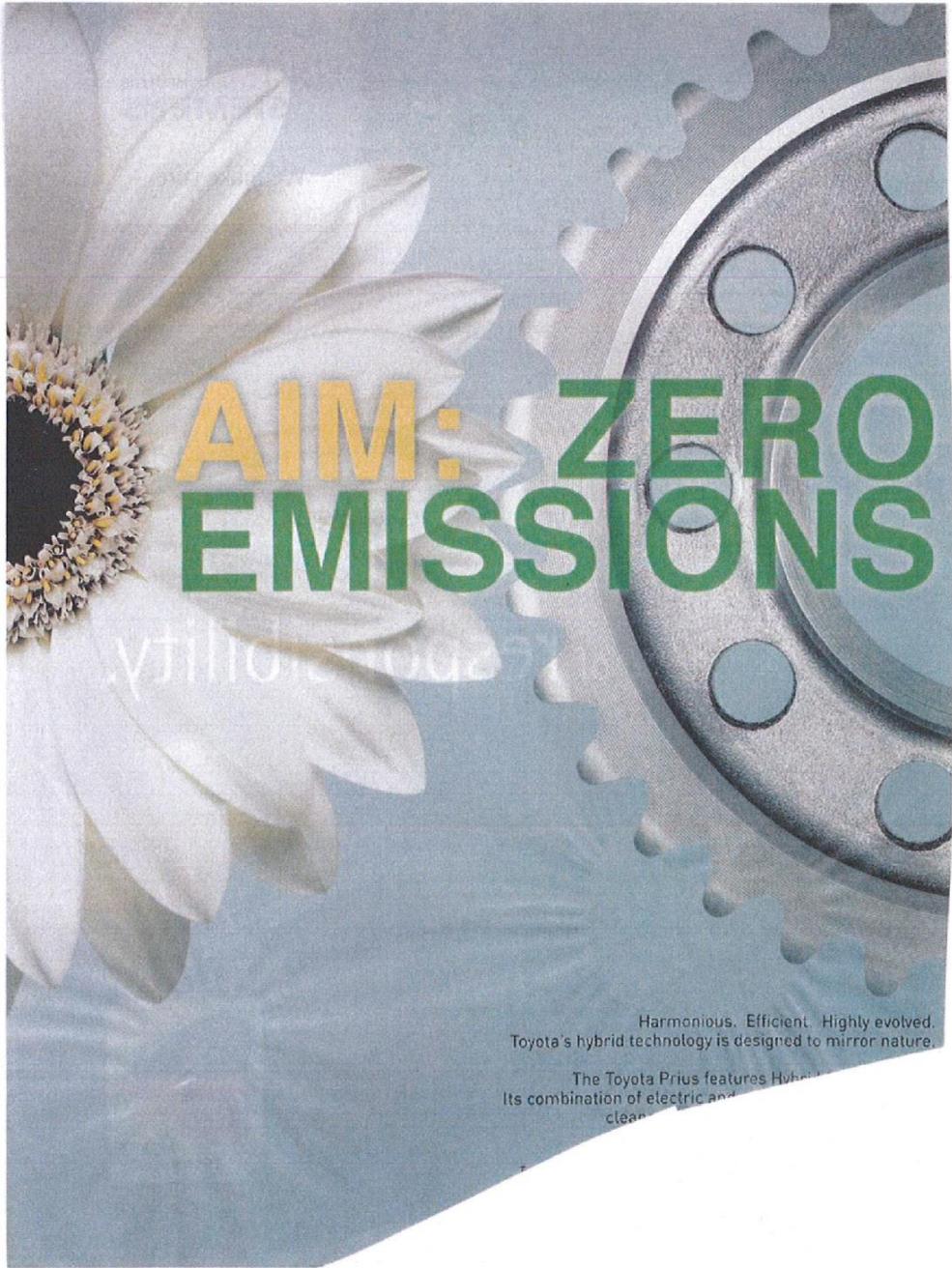
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OUTLINE

1. The challenge
2. Regulatory framework
3. Four options for maritime transport
4. Prospects for small-scale LNG use
5. Requirements for LNG deployment in maritime transport
6. Tasks for Euro-Mediterranean cooperation
7. Investment opportunities



AIM: ZERO EMISSIONS

Hybrid Synergy Drive

Harmonious. Efficient. Highly evolved. Toyota's hybrid technology is designed to mirror nature.

The Toyota Prius features Hybrid Synergy Drive. Its combination of electric and gas engines provides clean, efficient performance.

1. THE CHALLENGE

- **Urgent need to contain air and water pollution through the Mediterranean Sea**
- **The Mediterranean Sea has 3.5% of marine world surface of sea water while it is bearing about 20% of world maritime transport**
- **Vessels belch out large quantities of pollutants in the air (and water) principally sulphur and nitrogen oxides and particulate matter**
- **The International Maritime Organisation (UN-IMO) is requesting that sulphur content in maritime fuels be below 0.5% (down from today's 3.5%) by 1 January 2020 for any new shipping**

2. REGULATORY FRAMEWORK

- The Mediterranean Sea to become an Environmentally Controlled Area (ECA) according to timing to be decided by IMO**
- Baltic Sea, North Sea, The Channel are already ECA while the Adriatic-Ionian Sea is to become ECA by 1 January 2020**
- European Directive on (clean) maritime fuels 2012/33/EU of 21 November 2012 has been implemented by EU Member States**

IN BUSINESS YOU NEED
SPACE TO MANOEUVRE.



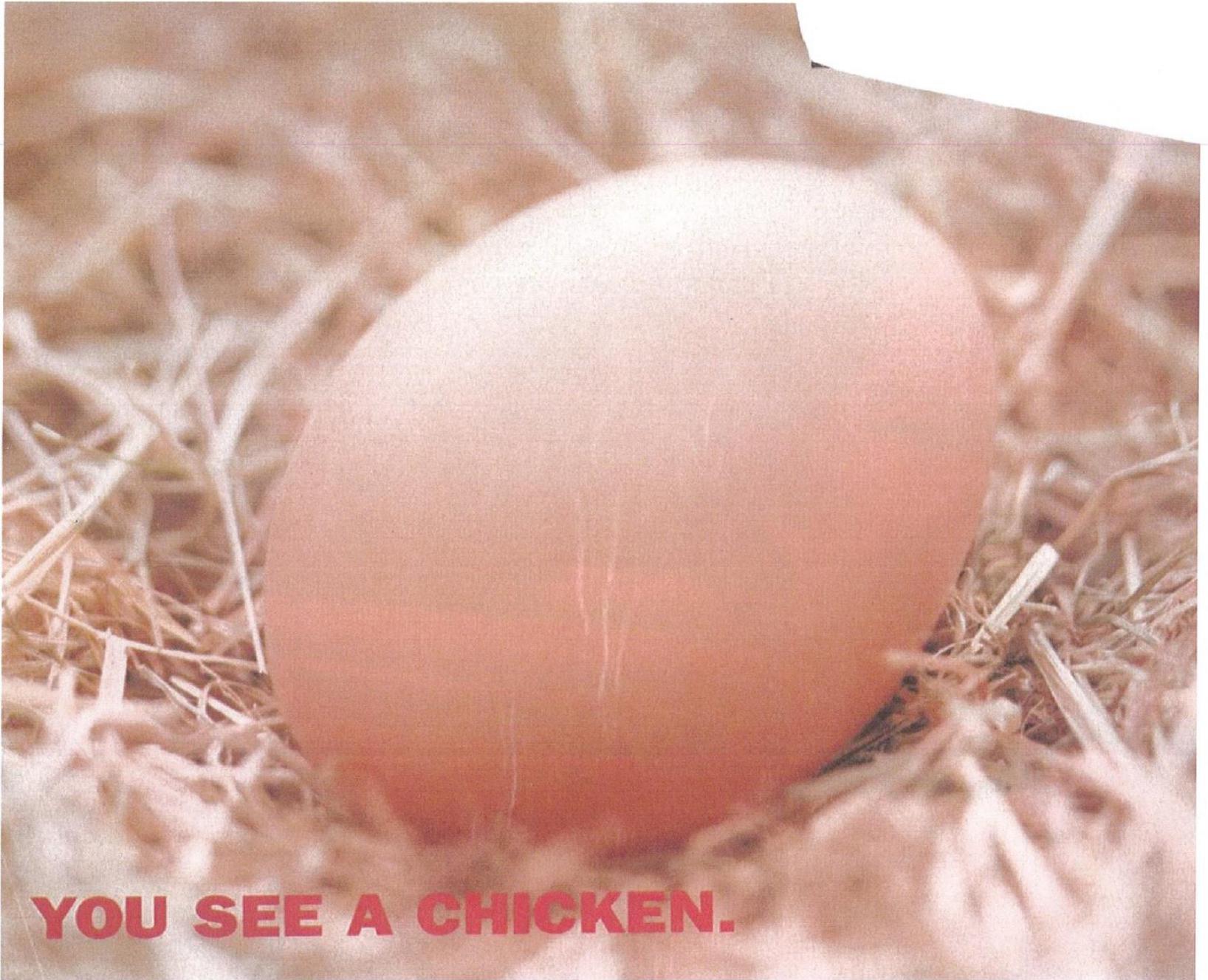
3. FOUR OPTIONS FOR MARITIME TRANSPORT

- a) Ultra-clean diesel fuels (and biofuels)**
- b) Scrubbers on board to remove sulphur and nitrogen oxides (new and retrofits)**
- c) Direct use of liquefied natural gas (small-scale LNG)**
- d) Electric propulsion**

Today: competition is between options b) vs. c)

4. PROSPECTS FOR SMALL-SCALE LNG USE

- **Small-scale LNG use for transport which started about 10 years ago is now demonstrated and widely deployed technology**
- **LNG has cost advantage and an additional benefit compared with adoption of scrubbers: low CO2 emissions (COP21 Paris Agreement of 2015)**
- **LNG is promoted for its use through the Adriatic-Ionian Sea in the framework of the EU Strategy for the Adriatic and Ionian Region as well as of the Italian National Energy Strategy of 10 November 2017**
- **LNG use for other types of transport (blue corridors in Europe) finds an expanding market**



YOU SEE A CHICKEN.

5. REQUIREMENTS FOR LNG DEPLOYMENT IN MARITIME TRANSPORT

- **LNG infrastructure and logistics: existing harbour storage in Barcelona and Marseille while storage facilities are being built in Piraeus, Ravenna, Sardinia**
- **Harmonisation of safety standards (roles for the International Standardisation Organisation (ISO), European Maritime Safety Agency (EMSA))**
- **Conversion of marine engines to LNG and dual fuel use (experience can be partly shared with land transport)**

6. TASKS FOR THE EURO-MEDITERRANEAN CO-OPERATION

- **Union for the Mediterranean (UfM) to introduce LNG in its Gas Platform of December 2016**
- **Mediterranean Energy Regulators (MedReg) to frame regulation for access and use of LNG storage and delivery**
- **Observatory for the Mediterranean Energy (OME) to include small-scale LNG use in its scenarios to 2040**
- **Dialogue 5+5 (France, Italy, Malta, Portugal, Spain + Algeria, Libya, Mauritania, Morocco, Tunisia) to include LNG in the West-Med Initiative by the European Union**

7. INVESTMENT OPPORTUNITIES

- **Small-scale LNG use for maritime transport in the Mediterranean Region is requiring co-ordinated effort by gas suppliers, shipowners, harbour authorities private and public financing**
- **Financial risk highly dependent upon progress in LNG use and co-operation amongst governments along the Mediterranean Sea**
- **Interesting projects exist for LNG logistics through the Mediterranean, adaptation of LNG terminals, building LNG storage facilities**
- **Development of gas resources in the East Mediterranean can provide additional thrust**

“A lift-off for great new benefits.”

