urban aqua
waterfront development

Living Spaces at the Water

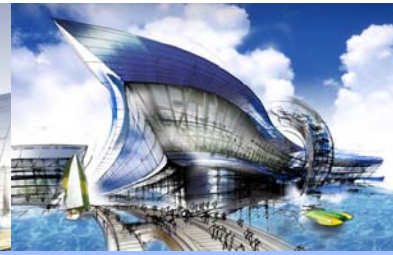
Living Working Tourism Sport

Architecture – Project Consulting

Comprehensive planning and construction involving water







Green Ports Genoa 2011

The German example: integration with the city and the coast

Dr. Peter Jansen
Secretary, ICOMIA Marinas Group (IMG)

ICOMIA MARINAS group

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Mission Statement - To promote and facilitate internationally the sharing and exchange of information in respect to the development and best practice management of marinas, boat storage facilities, boating access and associated infrastructure throughout the world.

IMC, the **ICOMIA Marinas Committee** is a working committee of the world marine industries body, International Council of Marine Industry Associations (ICOMIA).
Its dedicated to promoting and facilitating the sharing and exchange of technical and professional information concerning the **development of marinas** and other marine infrastructure around the globe. It also promotes best practice operational and environmental management of such facilities as well as fostering nautical tourism in the process.

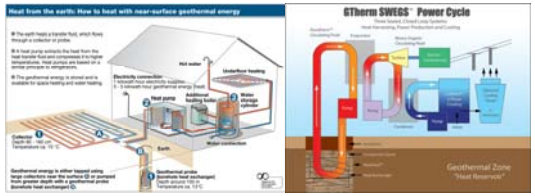
The IMC conducts outreach **education programs** for the benefit of developers, owners and operators of marinas, yacht harbours and dry-stack boat storage facilities as well as nautical tourism promoters in both the private and public sectors. These programs are linked to the IMC Committee meetings which are held two to three times a year in different parts of the world with the participation of local marina and yacht harbour organisations as well as government authorities.

Every third year IMC organises a world-renowned global marina industry education conference. This triennial **ICOMIA International Marina Conference** features professional presentations from a broad range of international industry experts.

1. General Overview

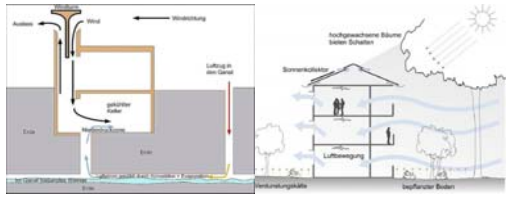
• Marine Power

• Geothermal Energy



• Solar Power

• Water Cooling



• Wind Power

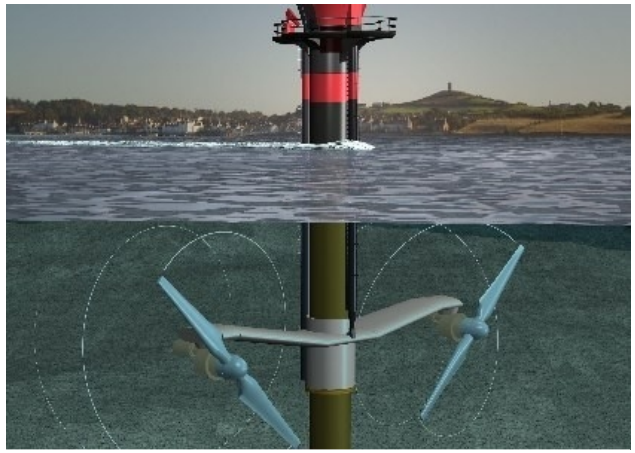
2.1 Example of marine power - Pelamis

- The Pelamis absorbs wave energy through hydraulic motion in order to power an electrical motor
- One floating body consists of multiple connected section which move individually to each other
- The generated energy is transferred to the coast via a single seabed cable
- Placed near coastlines with appropriate wave occurrence
- Extracts up to 750KW of energy from the waves

Pelamis wave energy system in testing

2.2 Example of marine power - SeaGen

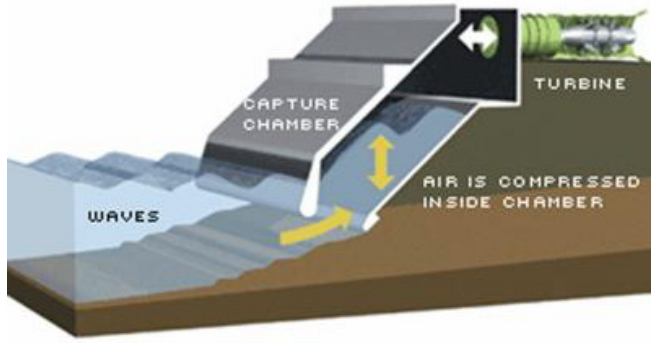
- The SeaGen uses the power of the marine tide in order to generate energy via two rotors
- Stands at a total height of approx. 40 meters and a 3 meter diameter
- rated at 1.2 MW of energy output for approx. 2.4 m/s strong currents
- Generates 3800 MW/h of annual energy output



Marine tide power station “SeaGen”

2.3 Example of marine power - WaveGen

- Uses and oscillating water column in order to compress air through the incoming waves
- The compressed air is forced to flow through an air turbine which powers an electrical generator
- Capacity of two 250 KW generators and an annual output of approx. 1MW
- Currently in testing to integrate WaveGen facilities into wave breakers at harbors



LIMPET oscillating water column

2.4 Example of solar power – solar boat

- Passenger ship for 60 passengers that emits no CO_2 into the atmosphere and uses no fossil fuels
- 24 solar panels with 5,16 kW per unit and 48V / 2x480 Ah batteries power two electric motors with 8 kW of power each
- Maximum reach without sun: 10 hours
- Reaches a top speed of 8 knots at a weight of 13 metric tones

Solon Suncat 58 solar passenger boat

2.5 Example of solar power – Solar buoys

Simple solar buoy

- UV-stabilized polyethylene with a thickness of 9.5mm molded into a seamless body
- Including solar units as an energy supply for lighting, GPS and remote controlling
- Integrated radar reflectors for navigation

Navigating solar buoy

Solar marker buoy

Navigating solar buoy

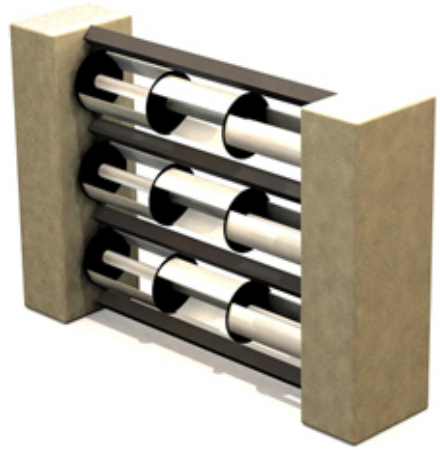
2.6 Example of wind power – Hywind project

- Installation of a 2,3 MW Siemens wind turbine on the open sea that generates and annual energy output of approx. 7,3 GWh
- The floating structure consists of a steel cylinder filled with a ballast of water and rocks
- The structure is held in place by a three-point mooring spread that is anchored at the seabed
- Hywind power systems can be deployed at water depths from 120 to 700 meters

Hywind prototype in operation

2.7 Example of wind power - Windpods

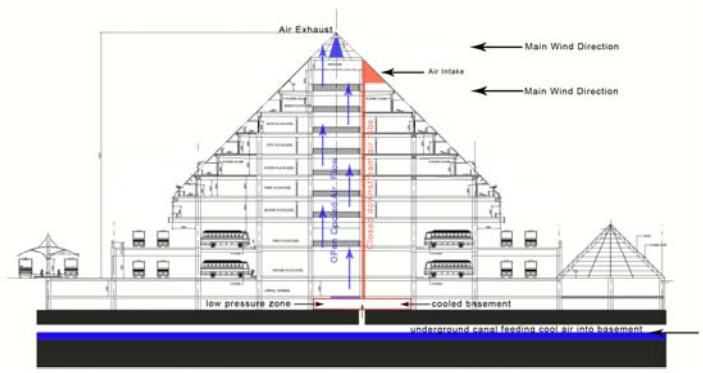
- Horizontally installed wind power system with a triple blade system
- Special rotor design and frames produce significantly less noise and vibration than large wind power stations
- Two triple rotor blade units produce an output of 1 kW at 12,5 m/s wind speed
- One unit costs approx. 4500 USD and 3100 USD for installation and setup



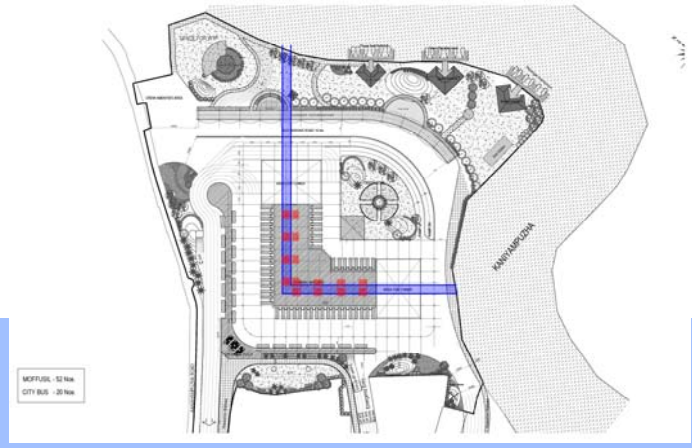
Windpod installed as part of wall

2.8 Example of water cooling

- Effective building cooling via underground water streams and low pressure zones in the basement
- Outside air is transported and cooled within the underground canal into the basement
- The cooled air effects the buildings climate and cools all rooms while moving upwards to the chimney
- Requires a cool water stream (e.g. nearby river) and continuous wind stream
- No air conditioning required nor energy supply needed for cooling



Passive water cooling for Mobility Hub, Cochin



ICOMIA MARINAS group

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Thanks a lot for your attention.

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