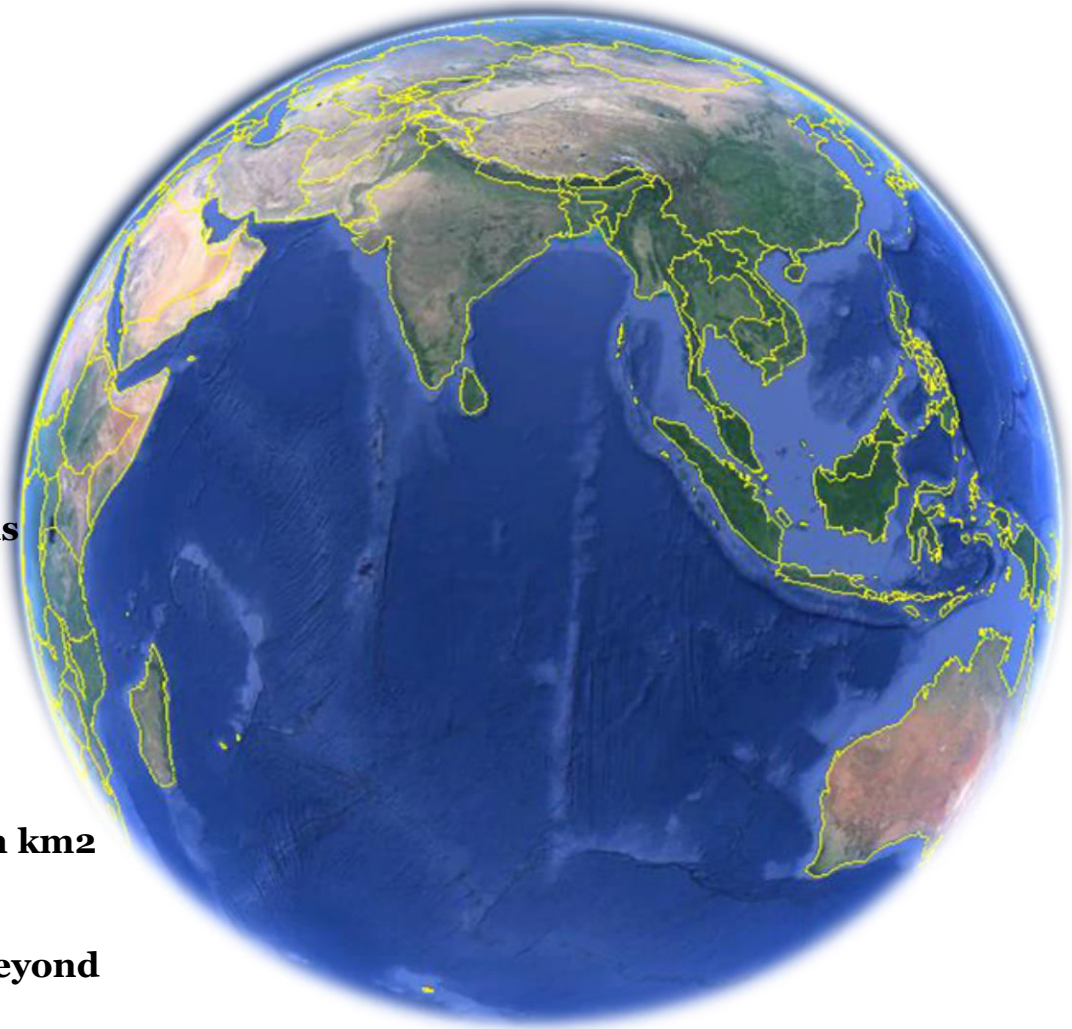
SUSTAINABLE BLUE ECONOMY

Maritime Affairs Unit

30 Jan 2014

Blue Planet

72% of the surface
95% of biosphere
97% water supply



- **Areas of the Earth covered by the oceans =335 million km2,**
- **High Seas = 200.4 million km2**
- **Territorial Seas =22.4 million km2**
- **Contiguous zone = 6.6 million km2**
- **Exclusive Economic Zone=101.9 million km2**
- **Total sea under national jurisdiction excluding extended Continental shelf beyond 200nm =131 million km2**

The “Rio +20” United Nations Conference on Sustainable Development (UNCSD)

- From Millennium Development Goals’ to Sustainable Development Goals’
- Institutional Framework for Sustainable Development
- Dependency on Ocean; Advancement of the “Blue Economy”
- Key Challenge;
  - Poverty eradication,
  - promotion of sustainable patterns of consumption and production
  - Protection of the natural resource base for socio-economic development.

UNCSD 2012: Future we want

"We Stress the importance of the conservation and sustainable use of the oceans and seas and of their resources for sustainable development, including through the contributions to poverty eradication, sustained economic growth, food security, creation of sustainable livelihoods and decent work, while at the same time protecting biodiversity and the marine environment and addressing the impacts of climate change."

Initiatives after RIO+20

- Ocean compact initiative
- UN Department on Economic and Social Affairs (UNDESA) expert group meeting on Oceans, Seas and Sustainable Development
- The Global Ocean Commission
- The Global Partnership for Oceans
- UN five year action agenda 2012-2016
- EU, FAO, OECD also endorsed concept of Blue Economy

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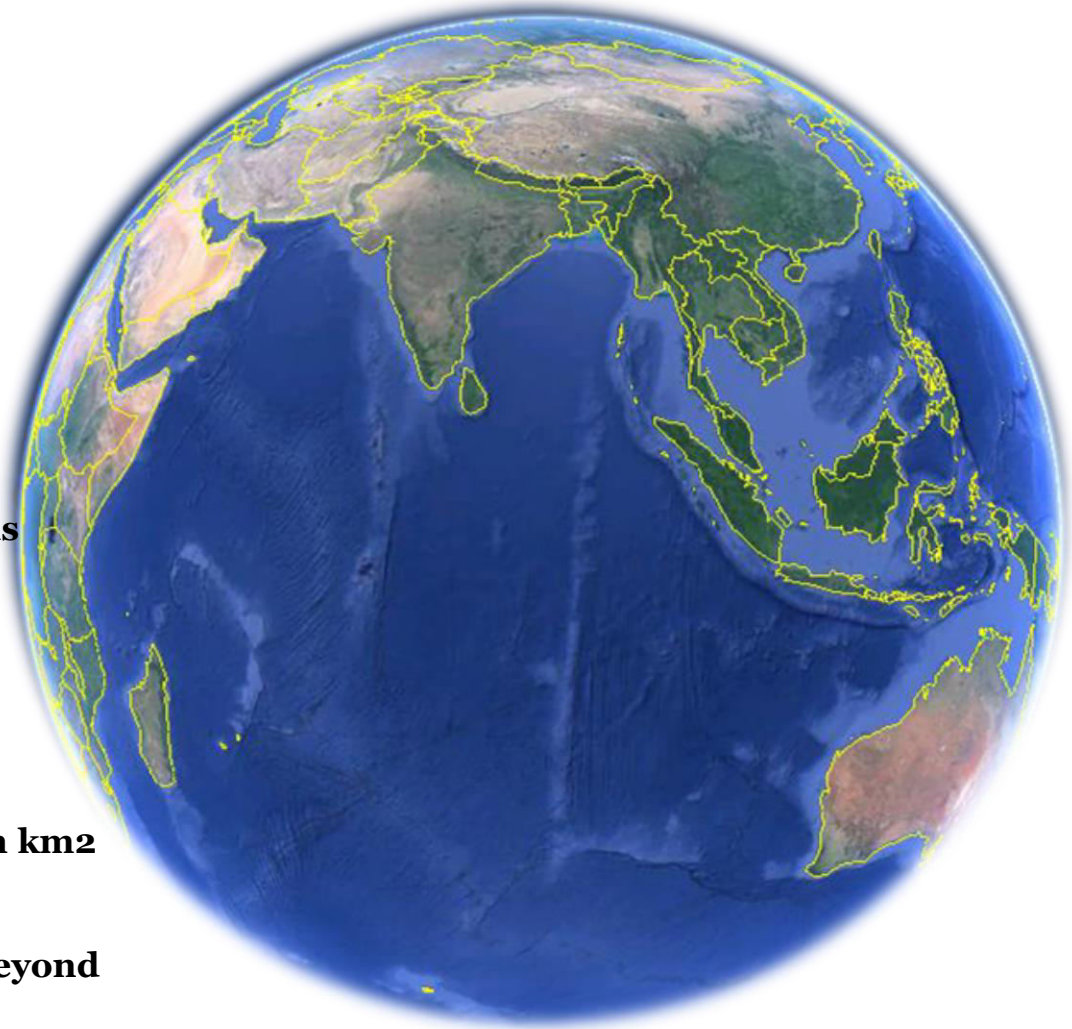

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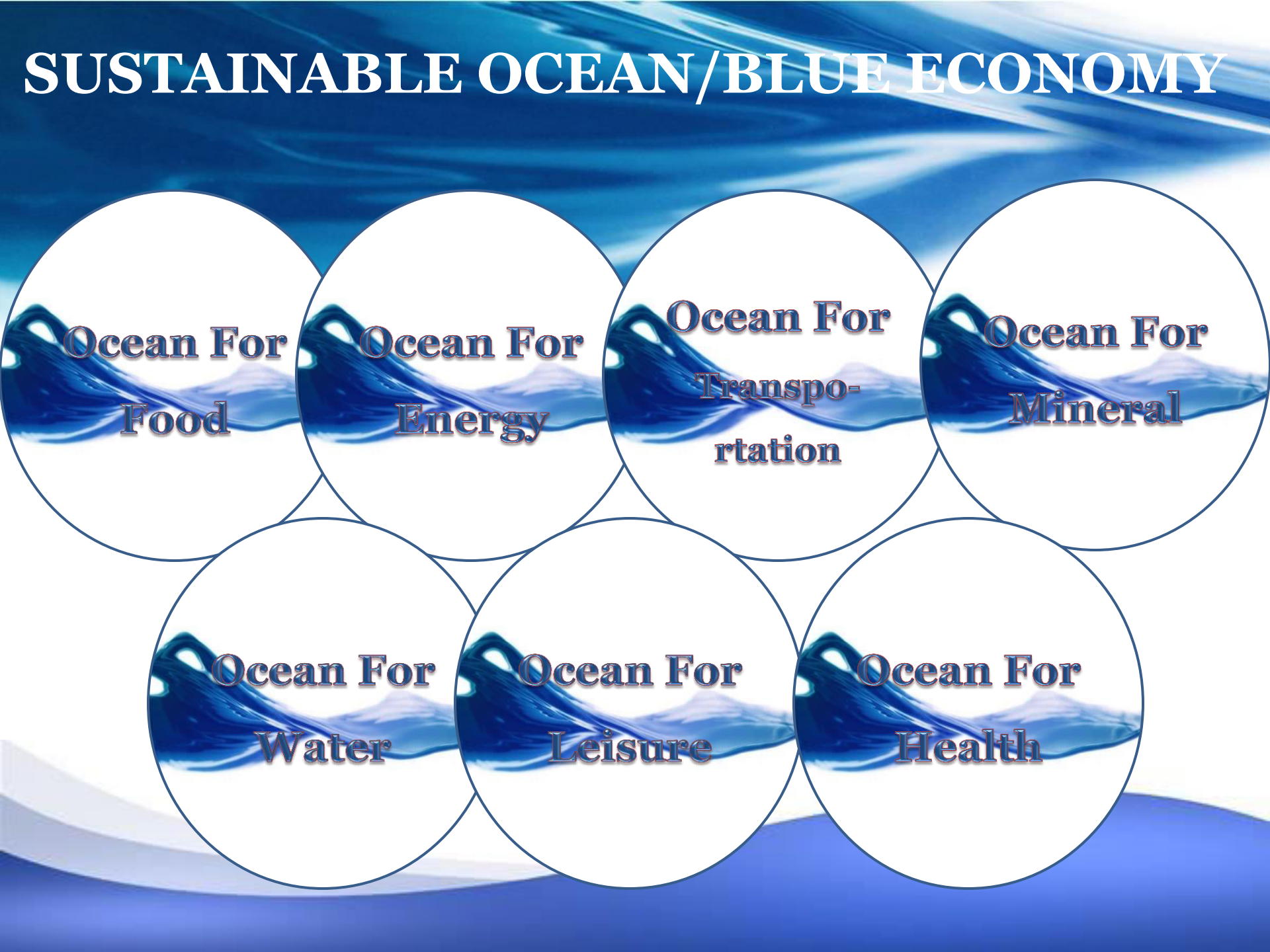
Oceans and Seas

- Support all life by generating oxygen, absorbing carbon dioxide, recycling nutrients and regulating global climate and temperature
- Food and livelihoods to substantial portion of the global population
- 80% of Global trades
- Global tourism industry, familiar “Sun, sand and sea” – nature based tourism.
- 32% of the global hydrocarbons
- Mining of seabed mineral resources
- Renewable blue energy from wind ,wave, tidal, thermal and biomass sources.

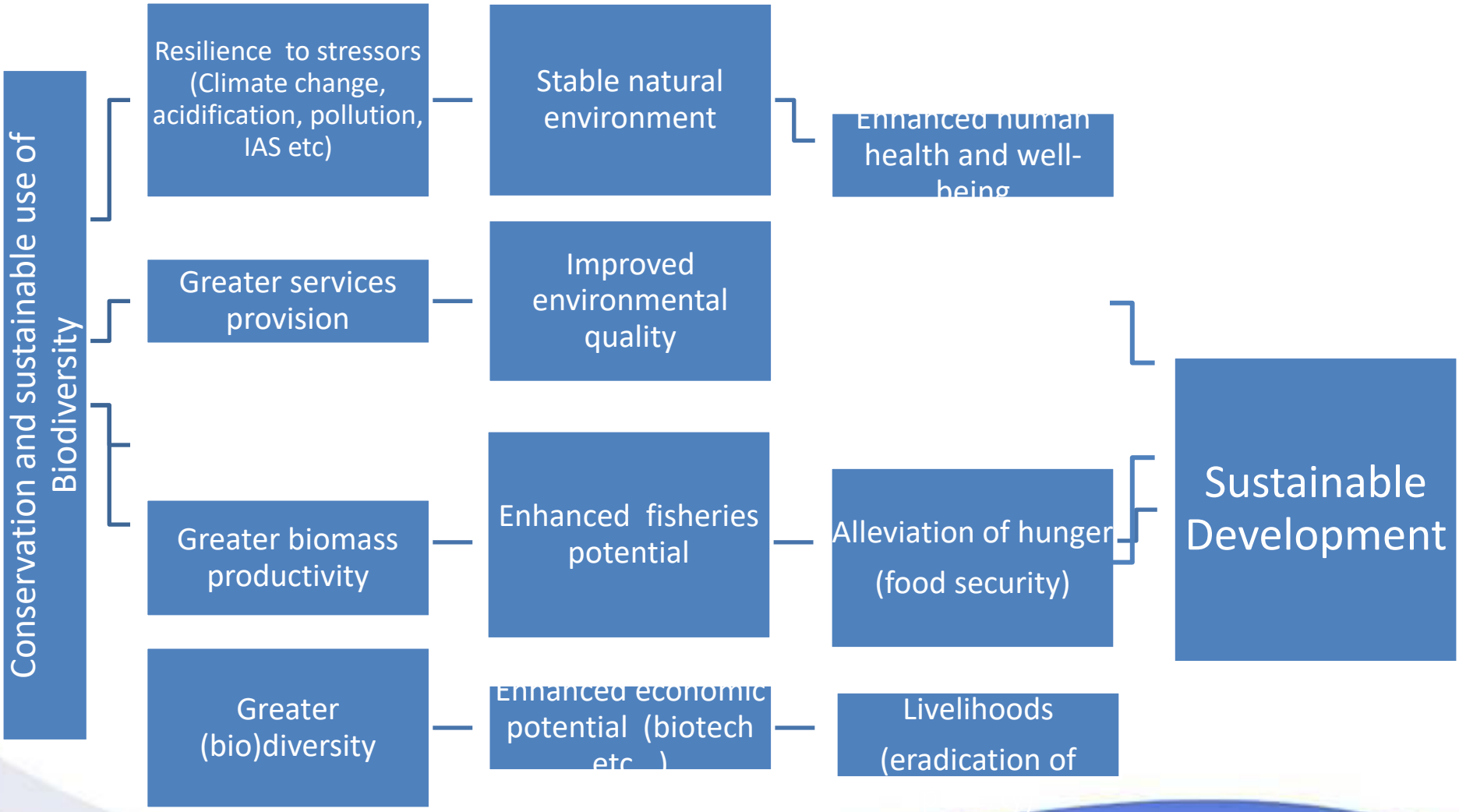
Concept of Blue Economy

- Oceans/High Seas constitute last Global commons or the last Frontier for humanity's future
- Blue economy is not marine fishing
- Ability to use ocean space as opportunities for development, energy possibilities, potential mineral wealth, protected areas that improve biodiversity conservation, climate change adaptation & provide increased food security
- Offers an approach to sustainable development better suited to circumstances, constraints and challenges
- Cutting age technologies and rising commodity prices – Submarine exploitation

SUSTAINABLE OCEAN/BLUE ECONOMY



Framework for Sustainable Development



The Blue Economy – *Challenges*

- Sustainable use of biodiversity - 20% of the world's coral reefs have been lost and another 20% degraded.
- Mangroves have been reduced to 30-50% of their historical cover
- 29% of sea grass habitats have disappeared
- Only 2% of our oceans are protected, despite the CBD/WSSD 2012 target of a representative 10% area, whereas approximately 12% of terrestrial areas are under protection.
- Ecosystem approach is required that factors in restoration of biodiversity and renewable resources, and proper management of resource extraction.

The Blue Economy – *Challenges*

Food security

- 1 billion people in developing countries depend on seafood for their primary source of protein.
- Aquaculture offers huge potential for the provision of food and livelihoods,.

Unsustainable Fisheries

- Marine fish stocks estimated to be underexploited or moderately exploited declined from 40% in the mid-1970s to 15% in 2008, and the proportion of overexploited, depleted or recovering stocks, increased from 10% in 1974 to 32% in 2008.
- Fishing fleet subsidies are between US$ 10-30 billion per year driving the further depletion of fisheries
- The benefits lost to fishing nations as a consequence of over fishing are estimated to be in the order of US$ 50 billion per annum.

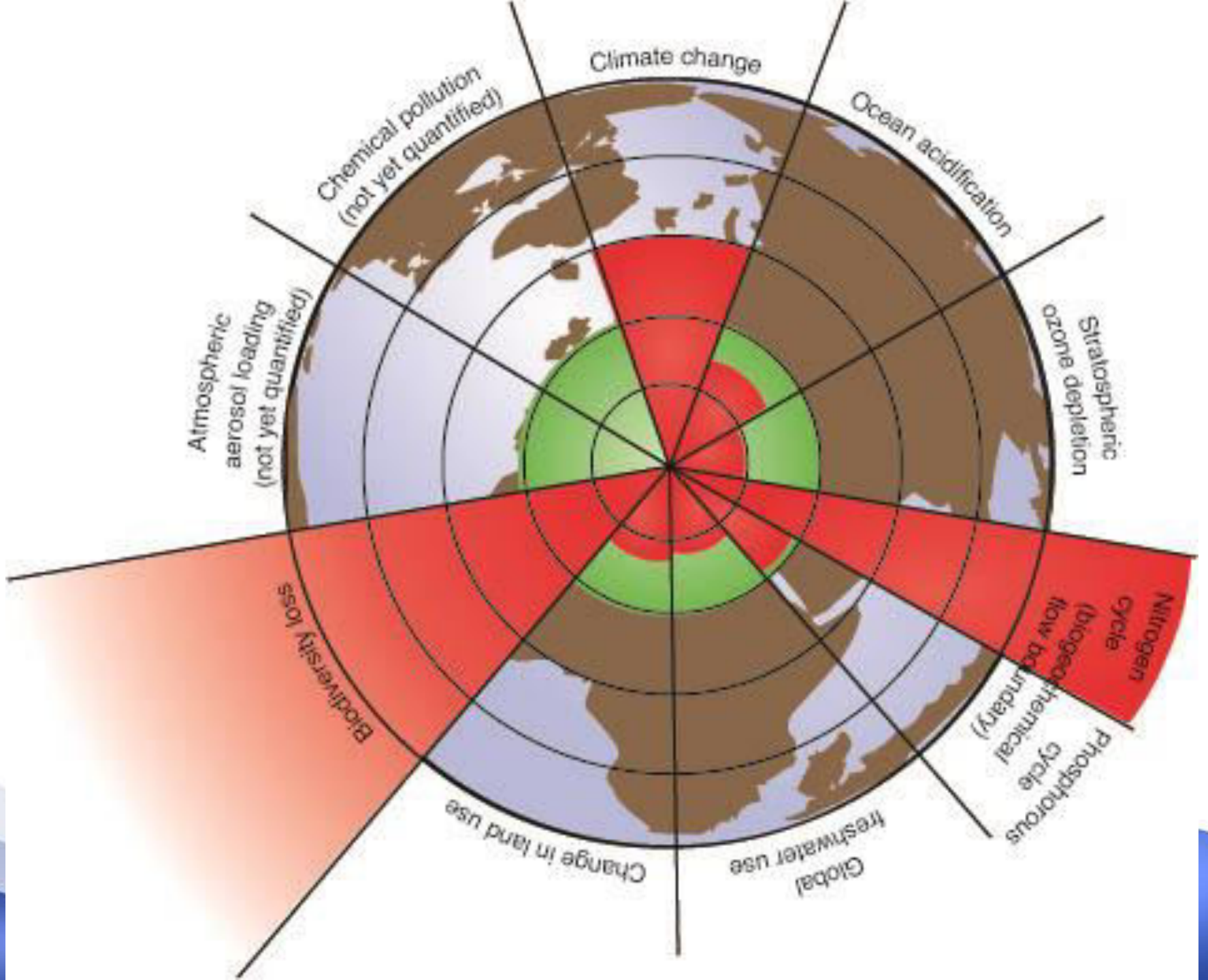
The Blue Economy – *Challenges*

Climate change and managing carbon budgets - Sea level rise and change in ecosystem status due to changing temperatures, from coral bleaching to impacts upon migration patterns.

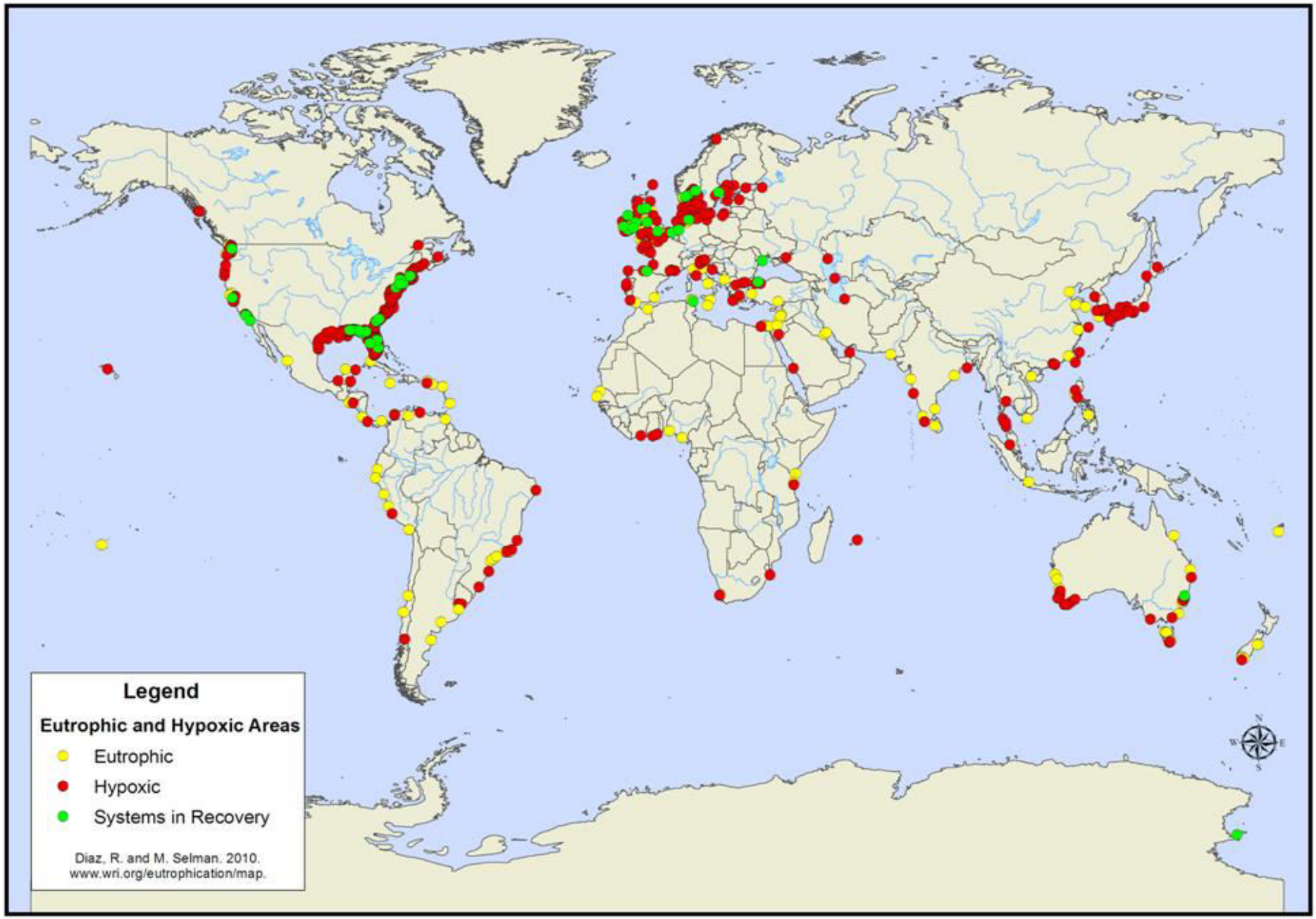
- New issues on the agenda are **Ocean Acidification and Blue Carbon**.

Pollution and marine debris

- The growing human population, intensification of agriculture and the rapid urbanisation of coastal areas - land based factors causing higher levels of pollution in our seas. Documented marine "dead zones" now number more than 400 covering an area of over 240,000 km^2 including some of the formerly most productive areas of estuaries and shelf.
- The "business as usual" model of nitrogen input will result in an increase of 50% in the fluxes of inorganic nitrogen to the Ocean by the year 2050.


Climate change
Ocean acidification
Stratospheric ozone depletion
Nitrogen cycle (biogeochemical flow boundary)
Phosphorous cycle (biogeochemical flow boundary)
Global freshwater use
Change in land use
Biodiversity loss
Atmospheric aerosol loading (not yet quantified)
Chemical pollution (not yet quantified)

World Hypoxic and Eutrophic Coastal Areas



The Blue Economy – *Challenges*

Marine and coastal tourism

- Data indicates that international tourist arrivals increased by 4% to 1.035 billion in 2012, generating US$ 1.3 trillion in export earnings.5% of global GDP and 6% of global jobs
- Tourism brings challenges in terms of greenhouse gas emissions, water consumption, sewage, waste generation and loss or degradation of coastal habitat, biodiversity and ecosystem services.

Governance and international cooperation

- Each sovereign country is responsible for its own resources and sustainable development.
- The need for structured international cooperation underpins all aspects of the Blue Economy.
- Updating and advancing governance mechanisms to ensure the sustainable development of waters beyond national jurisdiction or assistance in enabling the effective management and utilisation of national EEZs, capacity building, finance to support national marine spatial planning and effective monitoring, control and surveillance

Blue Economy Opportunities

HealthCare Products

Desalinated Mineral water

Renewable Energy

Transportation

Aqua-culture

Pharmaceutics

Seaweed Culture

Aquaponics

Pearl Culture

Environment Friendly ORGANIC

Science & Technology Driven

Job & Wealth

Democratisation of Economy

Thalassotherapy

Tourism

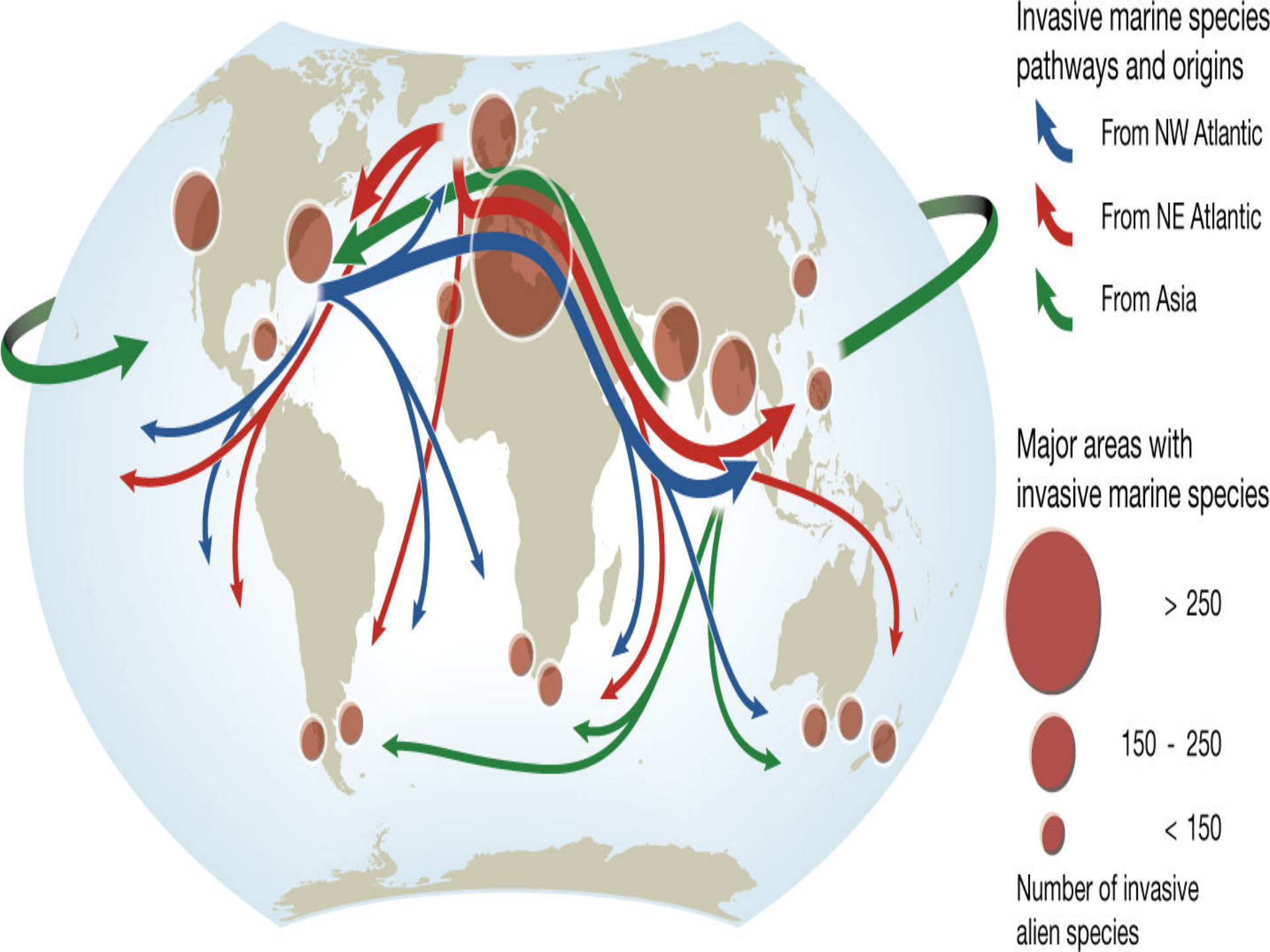
High Purity Marine Salt

Cosmetics

The Blue Economy – *Opportunities*

Shipping and Port Facilities

- 80 percent of global trade by volume, and over 70 per cent by value
- World seaborne trade grew to 8.7 billion tonnes despite the global economic crisis
- Container traffic is projected to triple by 2030.
- USD435 billion per year to the global economy and supports 14 million jobs
- Coastal countries need to position themselves in terms of facilities and capacities to cater for this growing trade and optimise their benefits.
- The IMO has brought in new industry wide measures to increase efficiency, reduce green house gas emissions and pollution and issues of IAS from ballast water and hull fouling
- Maritime trade set for growth and economic benefits offering expanding Blue employment opportunities for the foreseeable future.


Invasive marine species
pathways and origins
From NW Atlantic
From NE Atlantic
From Asia
Major areas with
invasive marine species
> 250
150 - 250
< 150
Number of invasive
alien species

The Blue Economy – *Opportunities*

Fisheries

- Globally 350 million jobs are linked to marine fisheries, with 90% of fishers living in developing countries.USD 100 billion per year to the global economy
- The value of fish traded by developing countries is estimated at US$ 25 billion making it their largest single trade item.
- Global catch rose from 4 million tonnes in 1900, through 16.7 million tonnes in 1950, 62 million tonnes in 1980 to 86.7 million tonnes in 2000 .
- In 2009 marine capture production was 79 million tonnes.
- Overall catch risks decline with 75% of stocks fully exploited or depleted. Human activity has directly and markedly reduced ocean productivity;
- USD 16 billion subsidies for fuel, tax breaks etc and estimated 50 US$ billion per annum is lost to overfishing

The Blue Economy – *Opportunities*

Tourism

- Tourism is a major global industry; despite the global economic crisis, constituted 9% of Global GDP (direct, indirect and induced impact).
- In 2012 tourism supported 9% of global jobs and generated US$ 1.3 trillion or 6% of the world's export earnings.
- International tourism has grown from 25 million in 1950 to 1,035 million in 2012 and the UNWTO forecasts further growth of 3-4% in 2013; the forecast for 2030 being 1.8 billion.
- Trends in aging populations, rising incomes and relatively low transport costs will make coastal and ocean locations ever more attractive.
- Cruise tourism is the fastest growing sector in the leisure travel industry; between 1970 and 2005 the number of passengers increased 24-fold to 16 million by 2011.
- Overall, average annual passenger growth rates are in the region of 7.5% and passenger expenditures are estimated in the order of US$ 18 billion per year.

The Blue Economy – *Opportunities*

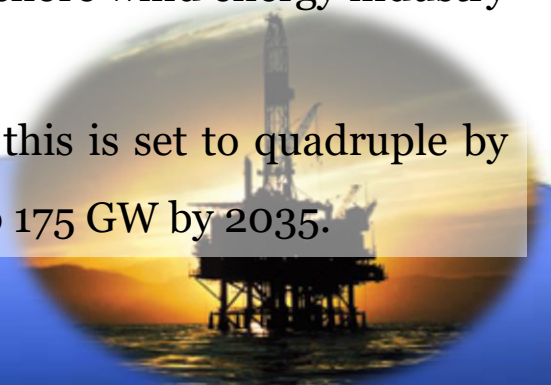
Aquaculture

- Aquaculture is the fastest growing global food sector now providing 47% of the fish for human consumption.
- Fish used for human consumption grew by more than 90 million tonnes in the period 1960-2009 (from 27 to 118 million tonnes)
- Aquaculture is projected to soon surpass capture fisheries as the primary provider of such protein.
- Fishmeal is increasingly being produced from fishery by-products - which now constitute over 25% of global production. Research indicates that at least 50% of fishmeal and up to 60% of oil in marine fish diets can ultimately be replaced with vegetable substitutes greatly increasing the scope for industry expansion.

The Blue Economy – *Opportunities*

Energy

- In 2009 offshore fields accounted for 32% of worldwide crude oil production and projected to rise to 34% in 2025
- Almost half the remaining recoverable conventional oil is estimated to be in offshore fields - a quarter of that in deep water.
- Deep water oil drilling is not new, but market pressures are making the exploration for and tapping of evermore remote reserves cost effective, bringing the most isolated areas under consideration.
- Methane hydrates, a potentially enormous source of hydrocarbons, are now being explored and tapped from the seabed.
- Ocean offers enormous potential for the generation of renewable energy – wind, wave, tidal, biomass, thermal conversion and salinity gradients. Of these the offshore wind energy industry is the most developed of the ocean based energy sources.
- Global installed capacity was only a little over 6 GW in 2012 but this is set to quadruple by 2014 and relatively conservative estimates suggest this could grow to 175 GW by 2035.



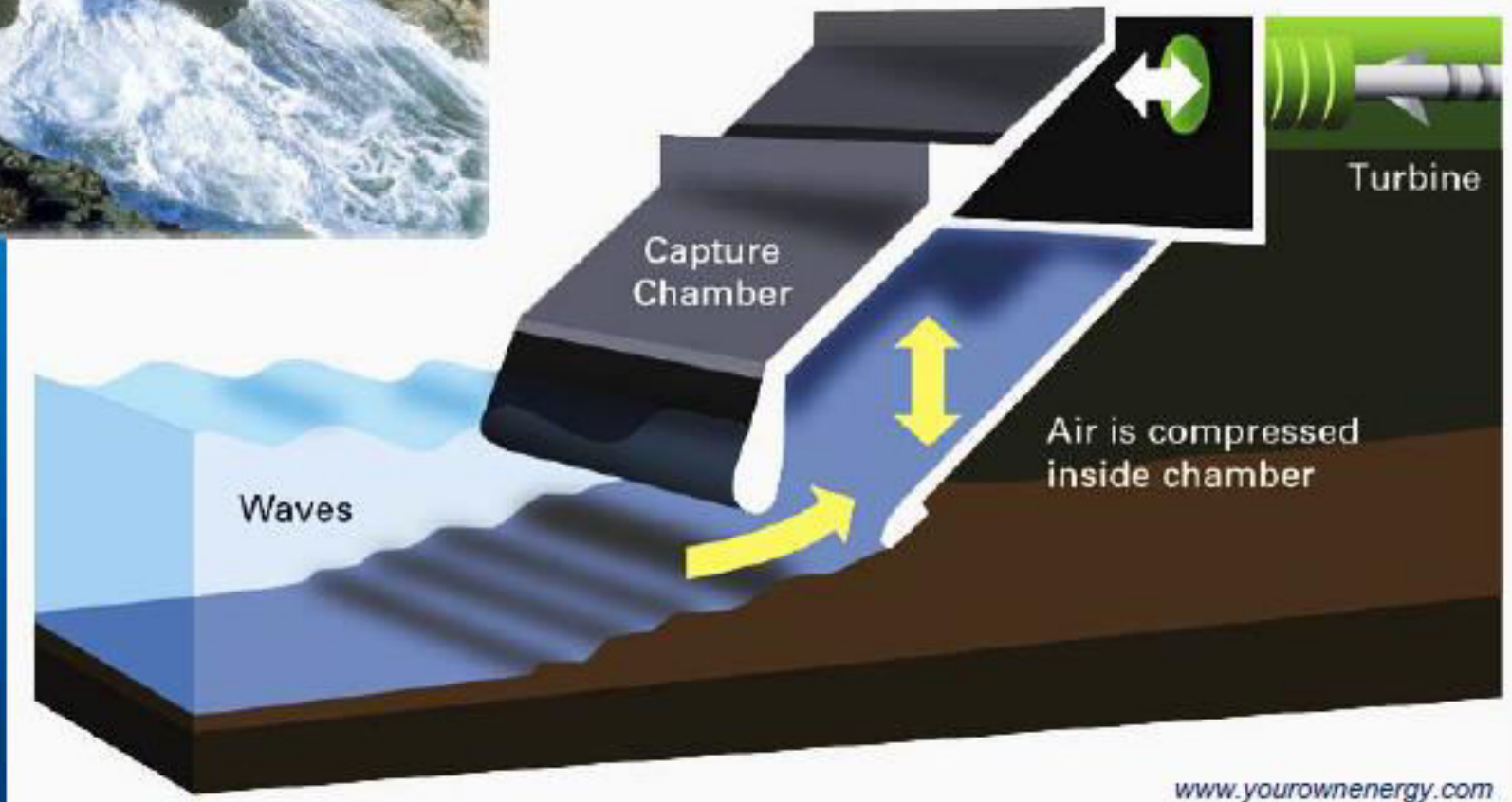
Offshore Wind Energy

Ocean Wave Energy Device - Pelamis

.75 KW

Ocean Wave Energy / Wells Turbine

WaveGen Oscillating Wave Column



500kw

Ocean Wave Energy – Oscillating water column

PowerBuoy

150 KW

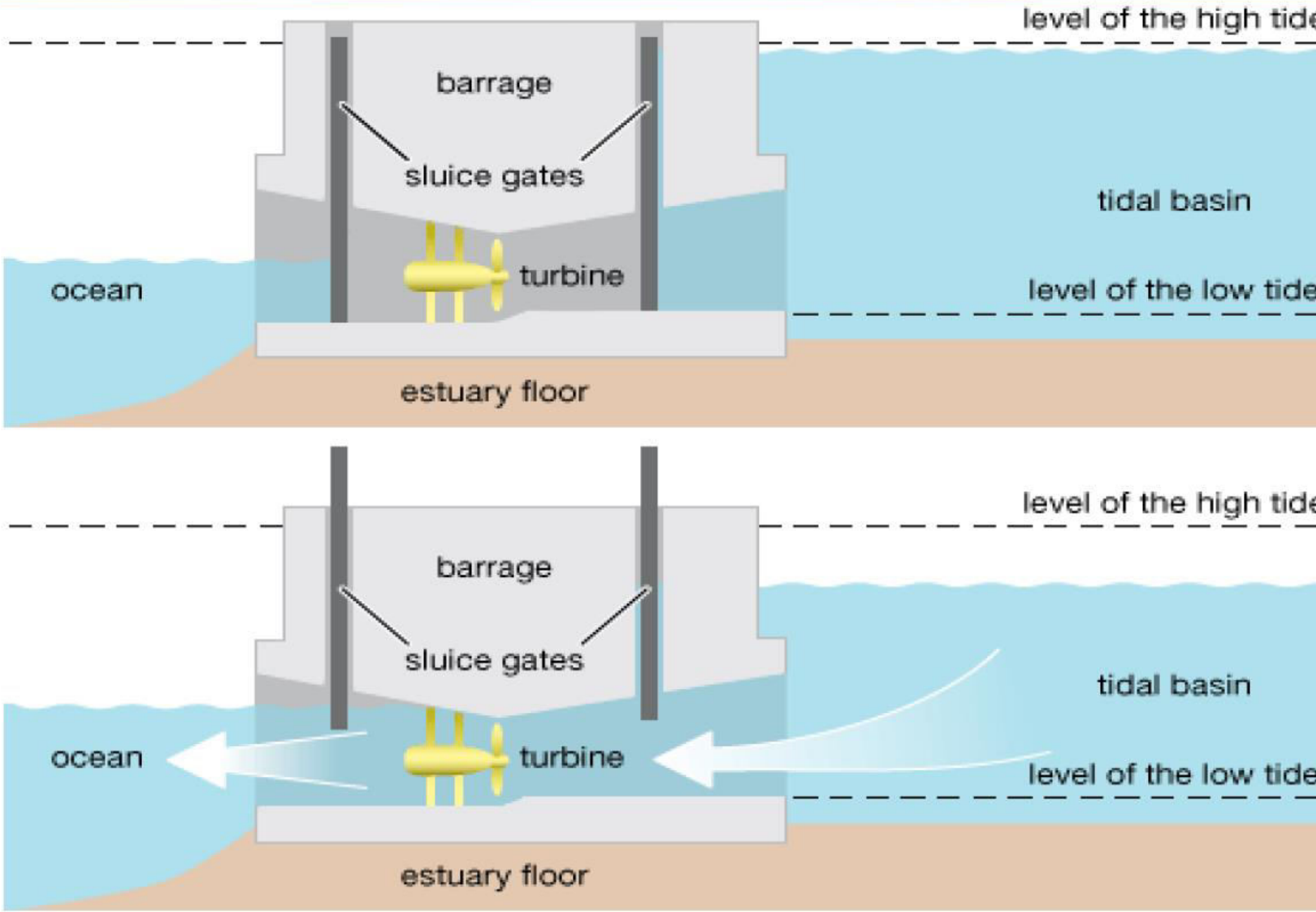
www.scotsrenewables.com

www.rechargenews.com

Ocean Wave Energy (CETO)

CETO

TIDAL ENERGY



Ocean Tidal Energy

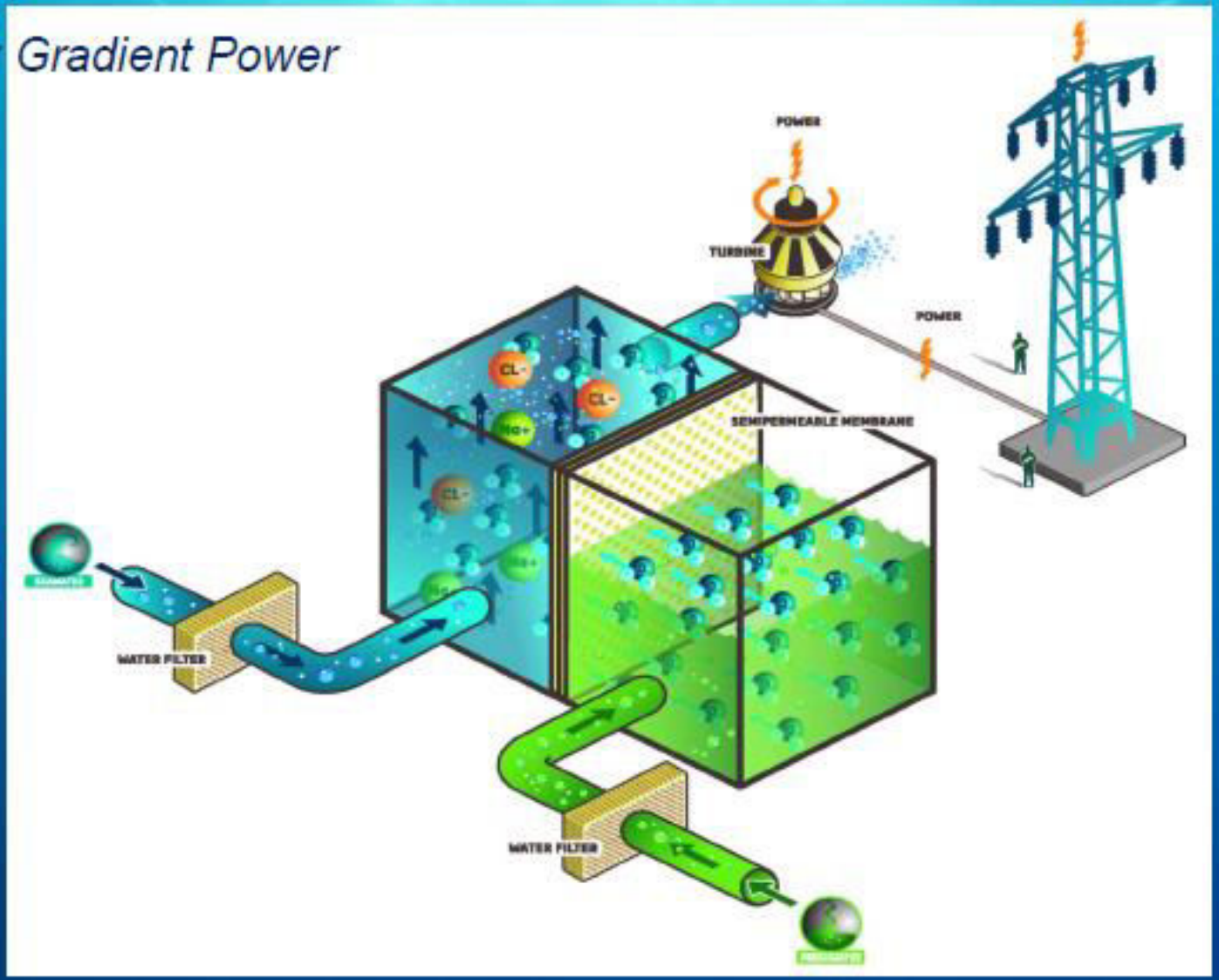
Ocean Current Energy

SeaGen Turbine

www.siemens.co.uk

Ocean Current Energy

Ocean Salinity Gradient Power



The Blue Economy – *Opportunities*

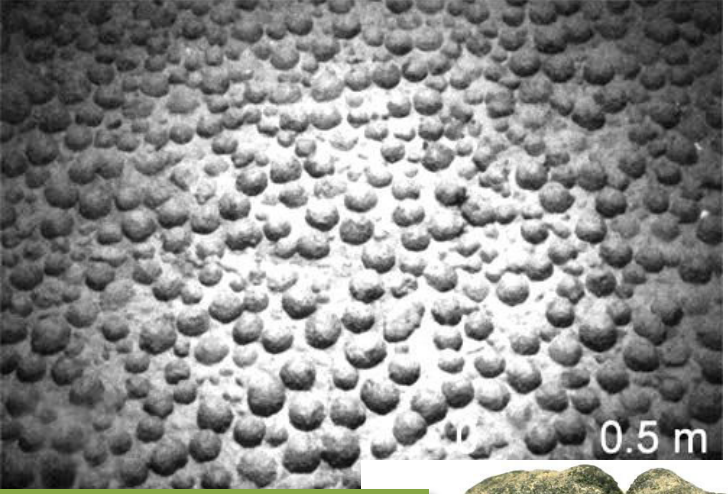
Biotechnology

- The global market for marine biotechnology products and processes is currently estimated at US $ 2.8 billion and projected to grow to around US$ 4.6 billion by 2017.
- Marine biotech has the potential to address a suite of global challenges such as sustainable food supplies, human health, energy security and environmental remediation.
- Marine bacteria are a rich source of potential drugs. In 2011 there were over 36 marine derived drugs in clinical development, including 15 for the treatment of cancer.
- The potential scope is enormous, by 2006 more than 14,000 novel chemicals had been identified by marine bio-prospecting and 300 patents registered on marine natural products.

The Blue Economy – *Opportunities*

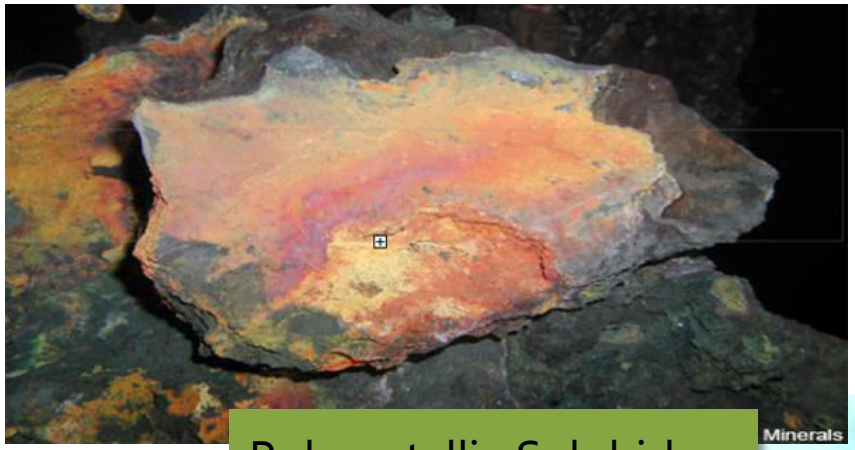
Submarine mining

- Exploration and exploitation of mineral deposits on and beneath the sea floor.
- Industry is turning its attention to the potential riches of polymetallic nodules, cobalt crusts and massive sulphide deposits; the latter a source of rare earth elements, such as yttrium, dysprosium and terbium, important in new ICT hardware and renewable energy technologies.
- Commercial interest is particularly strong in polymetallic nodules and in seafloor massive sulphides.

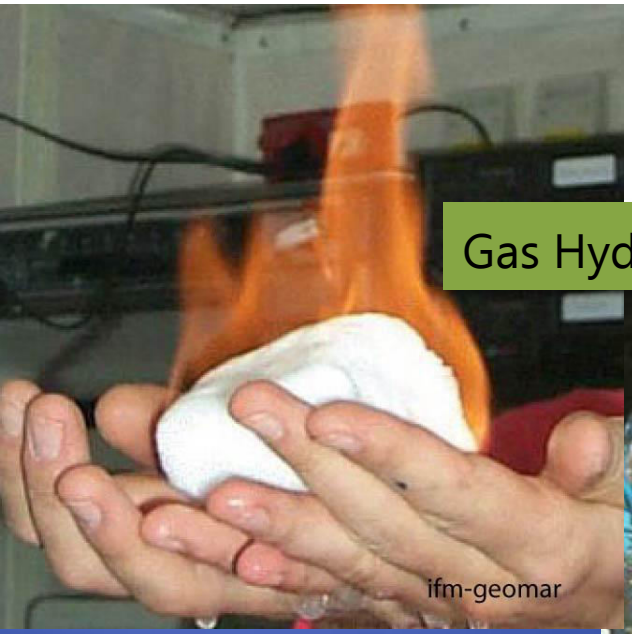


Manganese Nodules

Cobalt rich crust



Polymetallic Sulphides

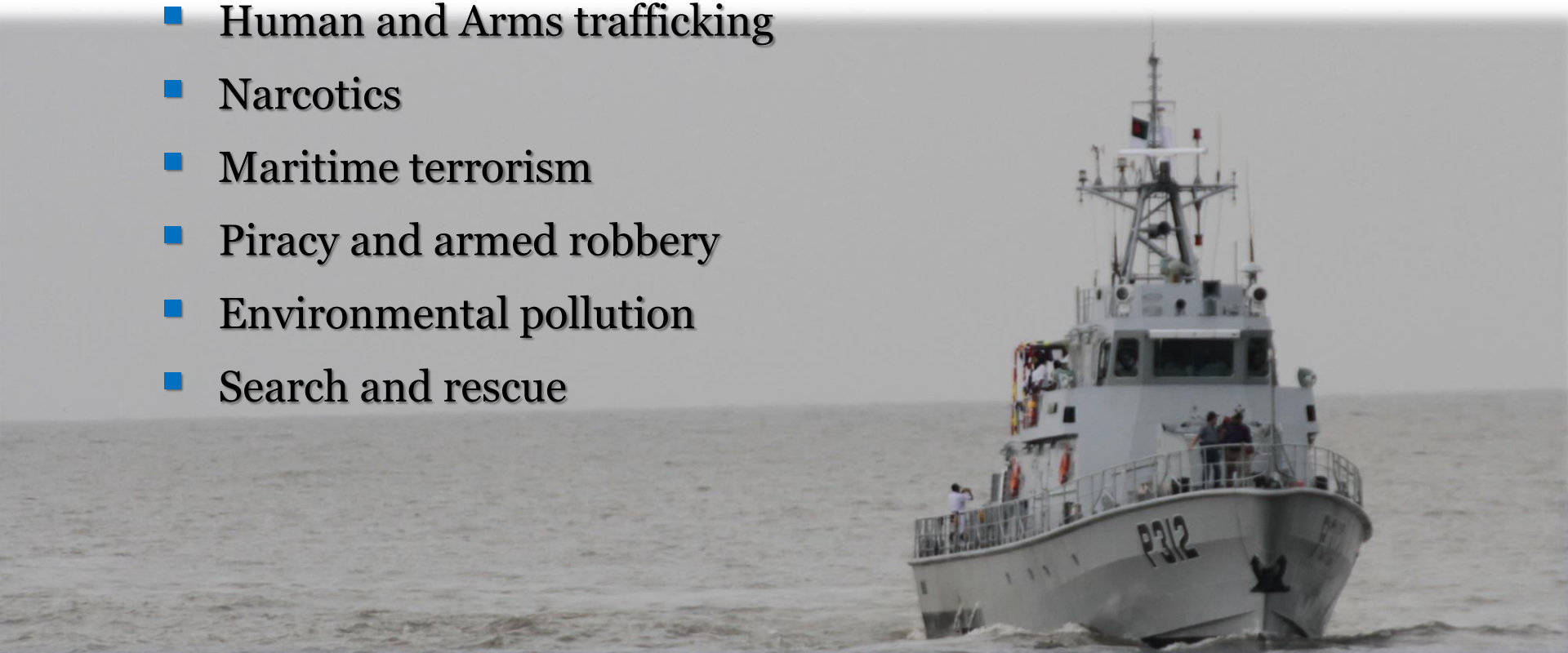


Gas Hydrates

Maritime Security

Securing our seas for a prosperous future

- Illegal, unregulated and unreported fishing (IUU)
- Human and Arms trafficking
- Narcotics
- Maritime terrorism
- Piracy and armed robbery
- Environmental pollution
- Search and rescue



Bangladesh Garments & Textiles Industry

Fisheries, Tea, Leather, Jute, Sugar, Tea, Salt, Pharmaceuticals, ICT, Rice etc

Community/Participating Approach with shared Responsibilities

Global & Regional Responsibilities

Managing for Uncertainty/Adaptive Management

Ecosystem integrity with Economic/ social/ environmental/ cultural concerns

Informed Policy making based on scientific evidence

Duty of care & Stewardship

Precautionary Principle

Polluter Pay Principle

Integrated Principles for Sustainable Ocean Governance in 1999

Offshore Energy Conversion Devices	Power Rating
Offshore Wind Turbines	3-5 MW
Pelamis Wave Energy Converter	0.75 MW
Wave Gen Oscillating Wave Column	500 kW
Power Buoy	150 kW
Sea Gen Turbine	1.2 MW
Open Hydro Turbine	1 MW

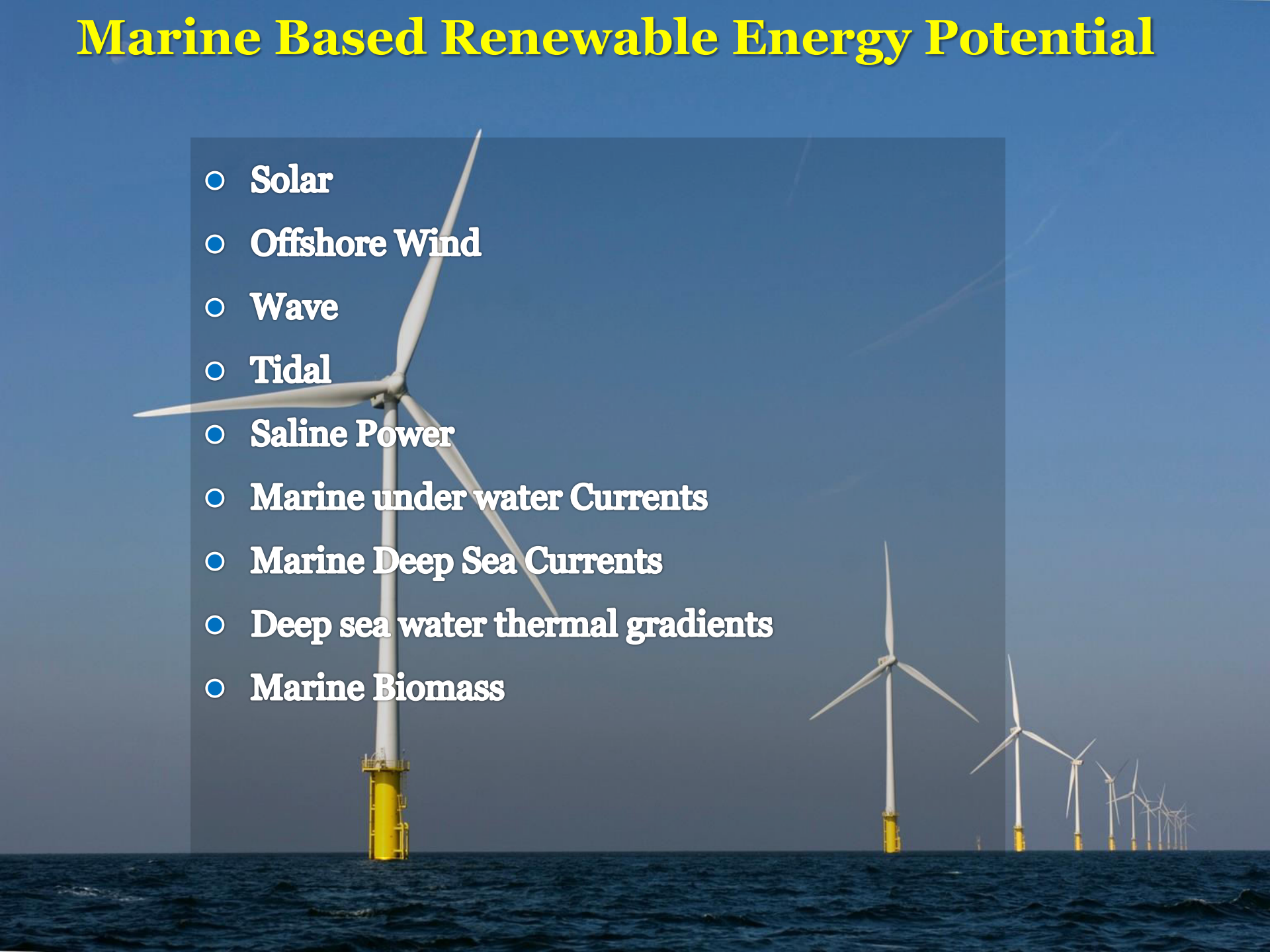
Challenges & Way Forward

- Reduce Waste
- Change Mindset for Ocean Technology
- Disinvest in land-based fossil fuel – Compensate
- Sorted out Grid Balancing Issues
- Promote Portfolio of Energy Sources
- Need for Ocean Energy Resources Assessments
- Need Scientific knowhow, data, & equipment
- Require international collaboration
- Adjust legal framework for offshore development
- Adopt the precautionary principle.
- An island Role-Model ??

The Blue /Ocean Economy

- Government's Programme (2014 – 2015)
- Sea Area/EEZ of 1,18,813 sq Km2
- Further submissions to the UN with respect to our continental shelf
- Expansion of our spatial boundaries, development of scientific knowledge and business opportunities
- Exercise of our rights can give us access to vast natural and mineral resources
- Extending the economic space for investors, businesses, workers, entire population by setting out a concrete and practical plan for developing the Ocean economic space
- High productivity jobs and improving living standards
- Exploitation of land/marine resources, land/sea transportation, cargo/port services
- Need for effective regulatory regime and skills

Marine Based Renewable Energy Potential



- Solar
- Offshore Wind
- Wave
- Tidal
- Saline Power
- Marine under water Currents
- Marine Deep Sea Currents
- Deep sea water thermal gradients
- Marine Biomass

The Blue Economy - Framework for Sustainable Development

- Initiative of Coastal developing countries and SIDS - waters beyond national jurisdiction.
- Oceans as "Development Spaces"- integrating conservation, sustainable use, oil and mineral wealth extraction, bio-prospecting, sustainable energy production and marine transport.
- Incorporates ocean values and services into economic modelling and decision-making processes.
- Development of and the sharing of benefits from marine resources
- Rio +20 Green Economy initiative namely: ***"improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities"***
- Endorses the principles of ***low carbon, resource efficiency and social inclusion***.

- Greater revenue from sea resources and reinvest in their populace, environmental management, and contribute to the eradication of poverty and hunger.
- Real value of the natural (blue) capital into all aspects of economic activity (conceptualisation, planning, infrastructure development, trade, travel, renewable resource exploitation, energy production/consumption).
- Sound management of resources in and beneath international waters by development and refinement of international law and ocean governance mechanisms.
- Share of the responsibility to protect the high seas, which cover 64 % of the surface of our oceans and constitute more than 90% of their volume.