Low cost alternative technologies to offset global warming

The World Energy Council (WEC) has recently published a report on the state of European environmental policies against global warming titled "European Climate Change Policy Beyond 2012" which describes state-of-art and future outlook from a European perspective (http://www.worldenergy.org/publications/). Among the most promising policies to fight global warming which could play a significant role in the mid and long term, the report identifies albedo control and Pipe§net (innovative freight transport system) which have been proposed and studied since many years at the laboratories of "Centro Interuniversitario di Ricerca sull'Inquinamento da Agenti Fisici" (CIRIAF) of University of Perugia.

Albedo Control System (ACS)

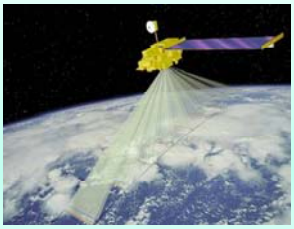
An effective solution to reduce global warming and counteract the effect of emissions of GHGs in terms of global temperature is the control of Earth's albedo by introducing laying "high albedo" surfaces. High albedo surfaces reduce absorbed energy, increasing the solar energy reflected into space, thus reducing the amount of energy contributing to the Earth's warming. This could be a more feasible technology when considering reliability, humanitarianism and economics: it is a friendly, technically simple and cheap solution which could be applied in countries with limited economic resources and high solar irradiation (e.g. Africa, tropical areas, etc.) to control the global average temperature increase.

Table: Comparison of avoided CO2-eq emission costs between different renewable sources and the white

Technology	Avoided CO2-eq costs
	c€/KgCO2-eq
Photovoltaic amorphous silicon	74.8
Photovoltaic multicrystalline silicon	83.0
Photovoltaic monocrystalline silicon	98.8
Thermal solar (flat collector)	14.5
Wind generator	3.9
Hydroelectrical	4.3
Carbon Capture Storage (N^{th} *of SCPC*)	4.6
Albedo control	4.4

ALBEDO CONTROL PROJECT

- ❑ Institution of a control agency which can assign carbon credits to high albedo surfaces
- ❑ Accurate measurements of reflected radiation
- ❑ Launching a satellite into a sun-synchronous polar orbit
- ❑ Multi-spectral radiative probe.
- ❑ People in development countries (i.e. Africa, India, China ..) earn selling carbon credit associated to the reflected high albedo surfaces



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Opportunities could arise for emerging markets and developing countries: if the global warming reduction effectiveness of reflecting surfaces was internationally acknowledged, these countries could make a greater contribution to the worldwide efforts towards a better climate. The project includes the institution of a control agency which can assign carbon credits to high albedo surfaces. The control will be made by accurate

measurements of reflected radiation through a proper satellite, to be placed into a sun-synchronous polar orbit, which would be equipped with a multi-spectral radiative probe.

Pipe§net Freight Transport System

Pipe§net system has been defined by EU Transport Commissioner Antonio Tajani as the fifth mode of transport along with road, train, air and ship. It is devoted to transfer light goods (50 kg) at very high speed (up to 1500 km/h), with connection time 20 times lower than road transport and energy saving up to 70%. Freight is transported into capsules; capsule propulsion is achieved by an electrical linear motor via frictionless support within vacuum-sealed, small width (diameter 1.5 m) tubes which can be laid like gas pipes on ground surface, underground and underwater . Infrastructure is costs effective: nearly 2 millions euro per km for a line of 1 tonne per second capacity. A distinguishing feature of Pipe§net is its application flexibility, in multimodal association (through inter and comodal services) with traditional transport systems which it can assist to connect high traffic freight nodes to transfer light goods: e.g. connection of seaports, backbone of Trans-European Networks routes, replenishment of industrial areas and cities, etc.

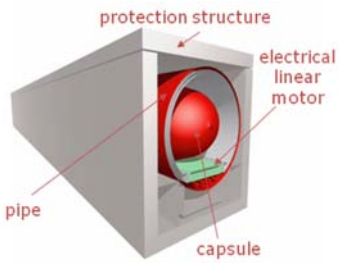
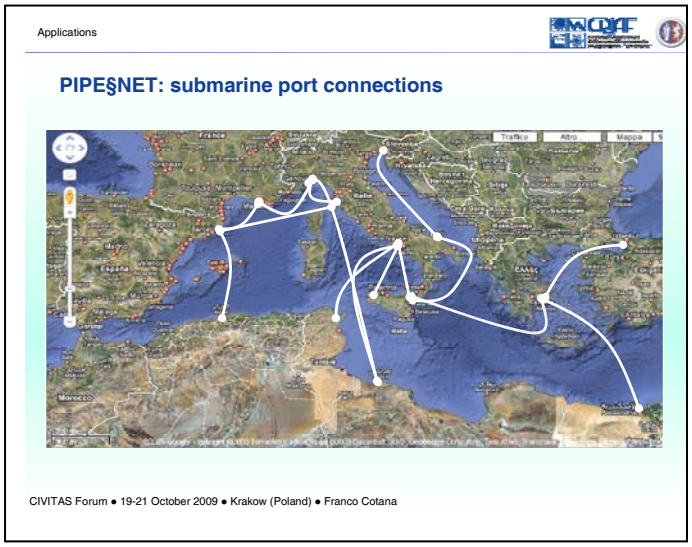
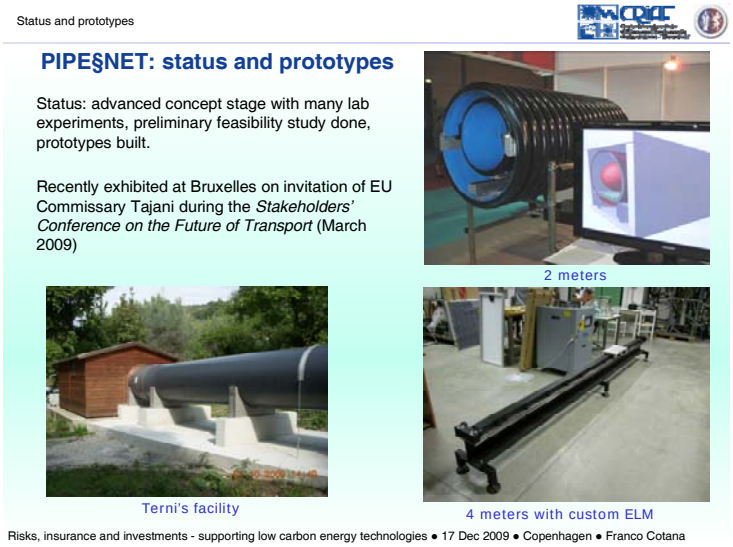


Figure: sketch of Pipe§net's





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