

2008 Award

Reducing the CO₂ concentration in the atmosphere



The laureate

First Prize

Francisco Gallo Meija – Spain

The theme

At a time when global warming is a major concern, the Altran Foundation suggested the subject "Reducing CO₂ concentration in the atmosphere: our technological challenge!". Open to all the sectors concerned (energy, automobile, industry, etc.), it is about ways to reduce CO₂ emissions, repair the damage caused by these emissions and raise awareness among the public.

Bamboo-based composites for sustainable architecture

This project is developing a Guadua bamboo-based bio-composite that can be used to construct buildings in tropical areas. The project impressed the Jury with the diversity and complementary nature of its approach.

On a technical level, the bamboo fibre makes it possible to create beams and panels that perform well and are affordable. On a socio-economic level, this project aims to stimulate the development of sustainable industrial activity that helps the local economy throughout its cycle. The objective is to enable local populations to take

ownership of the entire project, particularly through microcredit: purchasing land, producing bamboo, creating processing companies and building homes.

To conclude, the advantages for the environment are no less. The composite used consumes less energy, water and materials (wood, bricks, metal, etc.). Additionally, the system requires smaller machines and little transport, since the plantations are to be located near the end user. This technology develops a system that respects the environment, uniting capture, storage of CO₂ and technological performance.

One of the main difficulties of this project is in the development of low-cost production equipment to respond to the local economic conditions. This project is also part of several international programmes including INBAR (International Net for Bamboo and Ratam) and the European project "Iberoeka".

Altran Support

A group of experts joined together with Francisco Gallo Meija to help him progress on his project, working on several areas:

- Development of the composite technology, defining and testing samples
- Designing prototypes for sustainable houses
- Searching for and working with industrial partners
- Creating the initial budget
- Defining a communication plan
- Searching for financing
- International development

"The aim of this project is to make the BambHaus a basis of new life standard and to develop a new way to approach the relationship between People, Planet, and Profit" Francisco Gallo Meija, Project Leader

Results

The Altran experts, after having finalised the architectural and technical studies on the composite and its manufacture, designated the prototype of a sustainable home built from bamboo. To enable the project to continue to advance after the support period, they formed many partnerships with Spanish and international companies (manufacturers of homes and composite binders, among others). The experts also established a legal and organisational structure for the project, responding to many calls for tender for home construction, and managed communication, in particular by participating in a large number of events, conferences, etc.

The Finalists

Arnaud Feuga Muller – RUBISCO2, France

Producing biomass from micro-algae without releasing CO2

The project seeks to make any confined photosynthetic system an integral source of CO₂, effectively contributing to the bioremediation of greenhouse gas emissions. With two tonnes of CO₂ fixed per tonne of dry biomass produced, the potential for biofixation increases rapidly with the production of micro-algae in closed photobioreactors. Future applications: biofuels in particular. This project specifically focuses on the production of micro-algae in closed systems. The CO₂ added to help them grow is therefore not released into the atmosphere.

Olivier Lepine – Algo Source Technologies, France

Identification of chromosome anomalies through blood samples

This involves capturing the CO₂ produced by industrial activities, then using it to cultivate micro-algae. The biomass obtained can then be used in various industries: agri-food, green chemistry, energy. This biomass is reused in bio-refineries, in which the whole of the resource is used. The industrial production of micro-algae makes it possible to replace fossil carbons, which are a source of increased CO₂ concentration in the atmosphere, with a carbon-neutral renewable resource.

Christian Muller – Cooltech applications – MagCool, France

Reversible magnetocaloric air-conditioning for homes

The Cooltech Applications company has developed a system for automobile air-conditioning based on a technological breakthrough: the magnetocaloric effect. When submitted to magnetic alternation, a specific intermetallic alloy heats up and then cools down in repetitive cycles. The goal of the MagCool project consists of extending this innovative technology to include homes, by offering a system that is completely environmentally friendly, free from refrigerant gases and highly energy efficient. MagCool makes it possible to significantly reduce total consumption of electricity and thereby reduce the amount of CO₂ produced by electric power stations.

Siglinda Perathoner – University of Messina, Italy

Transforming CO2 into fuel

This project seeks to develop a photoelectrocatalytic (PEC) device capable of converting CO₂ into fuel at ambient pressure and temperature. Using water and solar energy, this device captures CO₂ in a liquid fuel (hydrocarbon or alcohol). It therefore acts to reduce the level of CO₂ in the atmosphere while producing a storable liquid fuel that can be converted, while avoiding expensive investments in extracting fossil fuels.

Casper van Oosten – University of technology Eindhoven, Ets Peer+, Netherlands

Smart Energy Glass

"Smart Energy Glass" is a new type of window that is able to control the amount of light that enters a room, while collecting solar energy. The window can be used in three lighting modes: dark, bright, and dim. This system has many advantages. It is invisible and integrated into the building, it enables savings in terms of air conditioning and energy, and the improvement in the indoor temperature of the building is achieved via natural and cyclical lighting. The project was developed by the Peer+ startup at the University of Eindhoven.



The jury

President of the jury

Dr Léopold Demiddeleer, Belgium

A doctor of physical chemistry, he is the director of R&D and New Business Development at Solvay. He is also a member of the Board of Directors of small technological companies and of EIRMA (European Industrial Research Management Association).

Peter Czermak – Germany

Director of the Institute of Pharmaceutical Technologies, he is also an associate professor in the Chemical Engineering Department at Kansas State University.

Jean-François Marchand, Belgium

Editor in chief of Energymag, he is also the creator of “In Site”, an editing and communication company specialising in commercial and institutional markets.

Gennaro De Michele, Italy

Executive Vice President of Enel Recherche, he is also a member of the Advisory Committee of the European Technology Platform and the IEA (International Energy Agency). He received the Philip Morris Prize for Scientific and Technological Research, as well as the National Prize for Industry and the Environment from the Minister for Industry.

Dieter Oesterwind, Germany

Director of the Centre of Innovative Energy Systems, he occupied various management functions in energy supply companies and was involved in the publication of about 40 articles and books.

Yves Roulet, Switzerland

Chief of the Unité Energie et Environnement (Energy and Environment Unit) of SIPAL (Service for Buildings, Holdings and Logistics) of the Canton of Vaud, he works to develop systems to create infrastructures that follow the principles of sustainable development to reduce energy consumption and greenhouse gases. An executive member of the eco-bau association, he is also the co-manager of the certification organisation MINERGIE-ECO.

Vasco Teixeira, Portugal

Lecturer in material physics at the University of Minho, he is also Editor in chief of the journal Nano Research and vice-president of SOPORVAC, Portuguese Vacuum Company. He is the president of the European scientific advisory committee of the SNN (Society of Nanoscience and Nanotechnology) and member of the executive council of the International Union for Vacuum Science, Technique, and Applications (IUVSTA).

Permanent Members

Edith Ackermann, USA

Associate professor at the MIT School of Architecture and Honorary Professor of Developmental Psychology at the University of Aix-Marseille 1

Jean Audouze, France

Vice-President of the French National Commission for UNESCO

Wolf Peter Fehlhammer, Germany

President of ECSITE-D former Managing Director of the Deutsches Museum in Munich

Marc Vainsel, Belgium

Holder of an agrégation qualification in paediatrics and General Administrator of the Fondation pour l'Enfance en difficulté (Foundation for children in distress) of the O.N.E (Birth and Child Office) in the French Community of Belgium.