SIXTH FRAMEWORK PROGRAMME

WORKSHOP 16th May 2007, Athens
"Alternative Fuels and Alternative Raw Materials in the Cement Industry"

ALF-CEMIND
Supporting the use of alternative fuels in the cement industry

SSA TREN/05/FP6/EN/S07.54356/020118

Workshop on Alternative Fuels and Alternative Raw Materials in the Cement Industry

Hotel Titania, May 16, 2007

George Georgocostas
General Director

EXERGIA S.A.

ALF-CEMIND Project I

- **Title**: Supporting the use of alternative fuels in the cement industry
- **Acronym**: ALF-CEMIND
- **Duration**: 18 months
  - Contract was entered into force on May 15, 2006
  - Effective starting date July 05, 2006
  - Duration 18 months from the effective starting date
- **Aim**: to assist the take-off of use of alternative fuels in the cement industry leading to energy, environmental, social and economic benefits
- **Targeted countries**: Greece, Bulgaria, Romania, Cyprus, Turkey, Poland

ALF-CEMIND Project II

Objectives

- To increase knowledge about the use of alternative fuels and alternative raw materials in the cement industry of the participating countries;
- To transfer technical expertise and practical experience from application, from countries advanced in the field and technology developers;
- **To prove applicability of technologies to a various implementation environments and understand the limitations/barriers;**
- **To produce and disseminate information on technical and economic feasibility of the use of alternative fuels in the cement industry.**

ALF-CEMIND Project III

Partners

- **EXERGIA S.A.,** Energy & Environment Consultants
- **SEC,** Sofia Energy Centre
- **TRAPEC,** Tractebel Project Managers, Engineers & Consultants
- **Van Heekeren & Frima** Management Consultants
- **C.I.E.,** Cyprus Institute of Energy
- **MERKAT,** Energy-Environment-Industry Manufacturing, Marketing, Consulting and Representation Inc.

Workshop's objectives

- To present the current situation in the Greek Cement Industry concerning the use of Alternative Fuels (AF) and Alternative Raw Materials (ARM) (preliminary study results)
- To analyze the potential barriers
  - Legislative/Regulatory framework
  - Licensing procedures
  - Waste market conditions/Availability of AF/ARM
  - Handling of AF/ARM
- **To exchange views on the abovementioned issues**

Workshop's agenda

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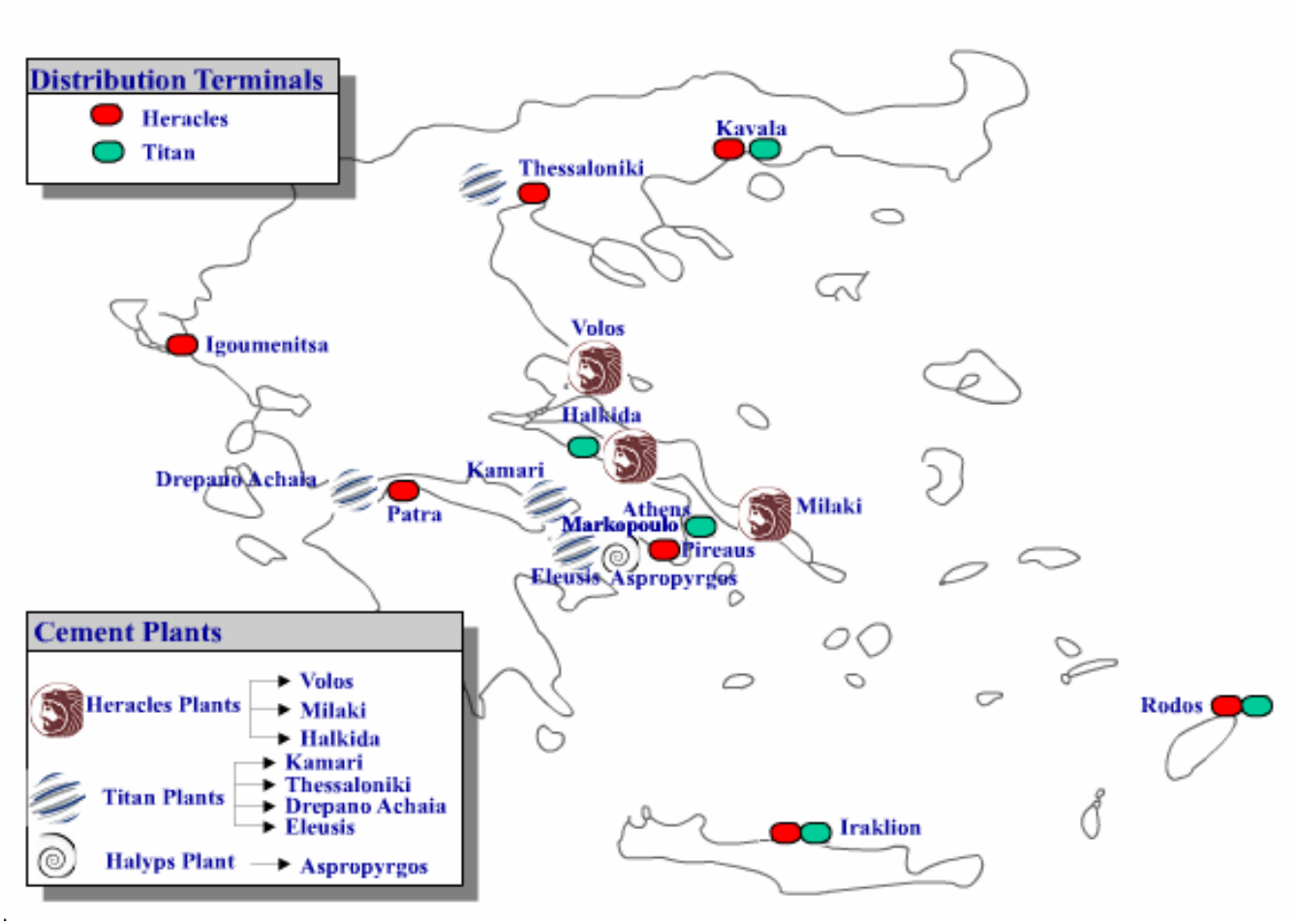
- Presentation of the project "Supporting the use of alternative fuels in the cement industry", *Mr. George Georgocostas – EXERGIA S.A.*
- "The Dutch example", *Mr. Victor Van Heekeren - Van Heekeren & Frima*
- Technology options for the cement industry with the use of alternative fuels, *Mr. Andreas Hand – KHD Humboldt Wedag*
- Coffee Break
- Waste Co-Processing in Cement Plants - The European Experience, *Dr. Jean-Marie Chandelle - CEMBUREAU*
- Presentation of Cement Companies
  - Heracles General Cement Company (member of Lafarge Group)
  - TITAN Cement Company S.A.
  - Halyps Building Materials S.A. (part of Italcementi Group)
- Discussion
- Working lunch
- End of the workshop

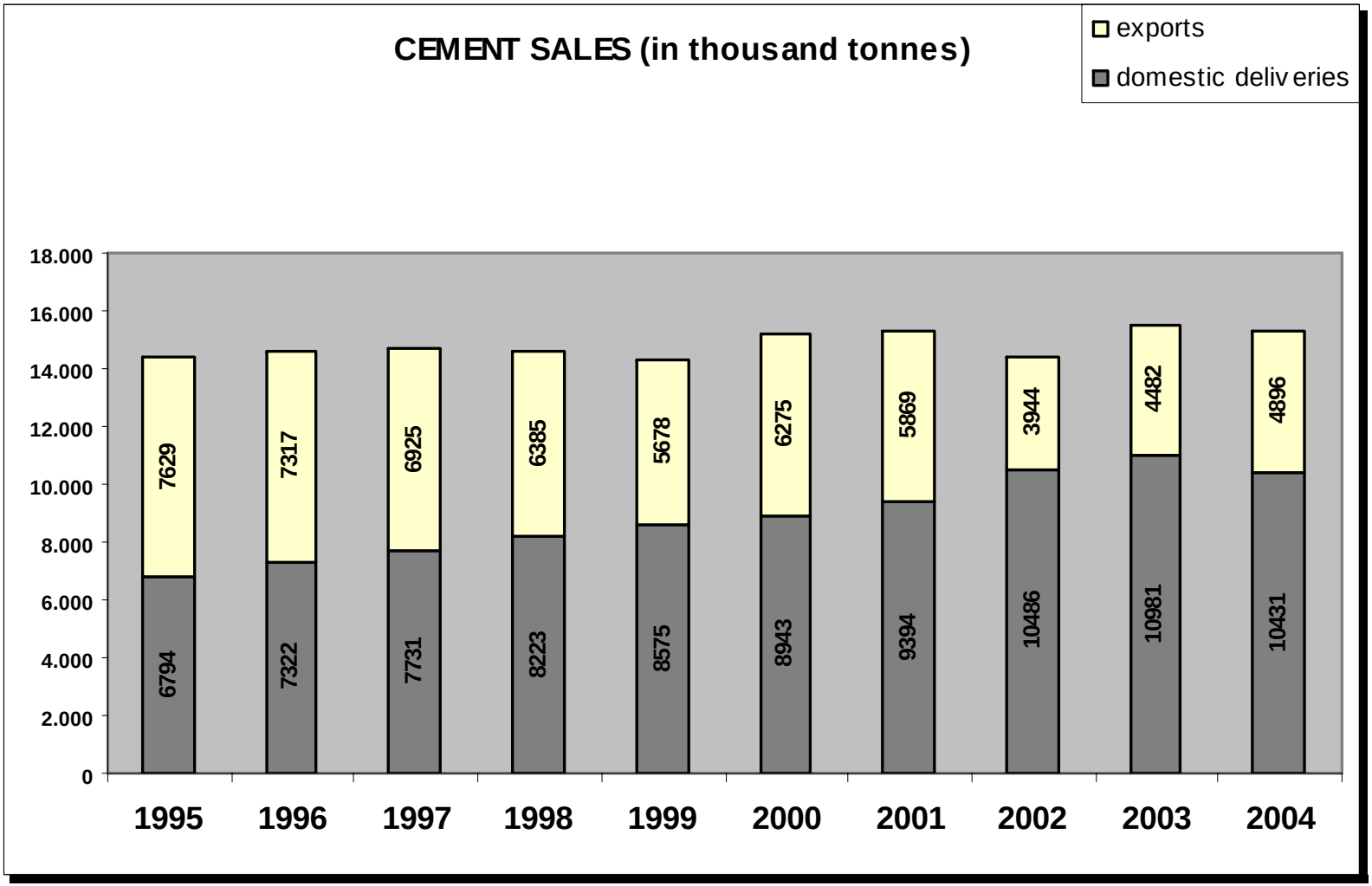
The Greek Cement Industry

- **HERACLES** General Cement Company
  - member of Lafarge Group
  - 3 cement plants in Greece
  - annual production capacity: ~ 9.3 million tons
- **TITAN** Cement Company S.A.
  - Greek owned company
  - 4 cement plants in Greece
  - annual production capacity: ~ 7.5 million tons
- **HALYPS** Building Materials S.A.
  - part of Italcementi Group
  - 1 cement plant in Greece
  - annual production capacity: ~ 1 million tons

Cement production and consumption in Greece I



Cement production and consumption in Greece III



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Supporting the use of alternative fuels in the cement industry
Contract No: 20118

Energy and Environment Consultants

The use of alternative fuels and alternative raw materials in Greece

- Potential types of AF and ARM in Greece are as below:

AF	ARM
Used tires Sludge from refineries Sewage Sludge (Psittalia) RDF Biomass Impregnated sawdust	Fly ash Blast furnace and other types of slag Other (Iron mill scale, Waste bauxite, Pyrite ashes, Chemical gypsum)

- Substitution of conventional fuels **< 1%** *(2001 data, Cembureau)*
- Significant potential for AF and ARM utilisation
- Why this low level of substitution?
  - Legislative framework, Regulatory issues?
  - Financial and/or other incentives?
  - Technology?
  - Other barriers?

Waste market conditions

- **AF & ARM producers in Greece**

  Steel industry, Coal power plants, Landfills, Sewage treatment plants, Food industry, Used tires, Other industrial premises, Hospitals

- **Service providers**
  - Companies set-up to collect and pre-process wastes up to certain level
  - Storage, handling and transportation companies
- **Market prospects**

  Expected increase of market volume as a result of:
  - legislative reforms
  - the need for fuel cost reduction by the cement industry
  - The urgent need for solutions to waste management problems (e.g. environmental pollution, municipal solid waste disposal, sewage sludge management, etc.)

Key barriers I

- Time-consuming licensing procedures
- Not fully implemented national waste management plan
- No financial and/or other incentives. (For instance, in other EU countries Cement Industry is being paid to incorporate AF and/or ARM from other industrial companies in contrast with the current status in Greece)
- Immature market. There are not waste management companies for all types of waste that can be utilized by the Cement Industry

Key barriers II

- Not adequate infrastructure - waste collection systems
- No environmental costs of waste disposal - Illegal landfilling
- National environmental targets **vs.** Local community concerns
- Small number of cement plants (limited demand) – Uncertainty to the waste supply side
- The relevant investments, even economically attractive, are very demanding in terms of capital and labour.

Legislative-Regulatory Framework I

- Use of AF and ARM in the Greek cement industry is treated within the Waste Management legislation
- A number of Laws and Decisions have been adopted, regarding Waste Management
- Greek Legislation follows the EU Directives
- AF and ARM are treated within this legislation*
- Nevertheless, the current use of AF and ARM in Greece is negligible due to poor enforcement mechanisms and specific policies

* JMD 22912/1117/2005 "requirements for incineration and co-incineration of waste"

Legislative-Regulatory Framework II

- The use of AF and/or ARM in existing plants requires amendment of environmental licenses*

Environmental Impact Assessment (EIA)

- A new EIA study is required outlining all the measures taken so as to ensure:
  - Conformity with JMD 22912/1117
  - Heat Recovery Maximization
  - Flue gas handling conformity with the Law
  - Minimization of hazardous impacts of residues

* According to JMD 22912/1117 of 6-6-2005, cement kilns are classified as co-incineration units.

Legislative-Regulatory Framework III

Waste Disposal Permit*

Specifies:

- Types and quantities of waste streams
- Includes detailed engineering design/operation modes
- Measuring systems
- Reclamation measures

* Disposal Permit is issued by the competent Prefecture, according to JMD 50910/2003.

Legislative-Regulatory Framework IV

Handling

The operator of the co-incineration unit is obliged to:

- Take care of all protective steps during delivery and reception of wastes so as to minimize the risk of any negative impact
- Determine the quantities of each waste category according to the European Wastes List
- Carefully check their characteristics, so as to ensure compliance of the unit with the requirements of the environmental licenses

Handling procedures to be observed

- Checking the documents according to the applicable legislation and the European Regulation 259/1993 as currently applicable.
- Samples prior to delivery