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# DEVELOPMENT OF A MODEL FOR THE SUSTAINABLE MANAGEMENT OF INDUSTRIAL AREAS IN GREECE

I.-S. Antonopoulos\*, A. Zouboulis\*\*, P. Samaras\*\*\*, A. Karagiannidis\*

\* Laboratory of Heat Transfer and Environmental Engineering, Department of Mechanical Engineering, Aristotle University, Box 483, GR 54124, Thessaloniki

\*\* Laboratory of General and Inorganic Chemical Technology, Department of Chemistry, Aristotle University of Thessaloniki

\*\*\* Department of Food Technology, Alexander Technological Education Institute of Thessaloniki



1<sup>st</sup> International Conference on:

"Waste Management in Developing Countries and Transient Economies"

Mauritius, Africa - September 5<sup>th</sup> - 8<sup>th</sup>, 2011

Aristotle University of Thessaloniki



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## Main target



- The study aims to implement a model for the sustainable existing Industrial Areas (IAs)
- The sustainability is referred to:
  - social
  - environmental and
  - economical aspect
- Integration of environmental friendly solutions into the Regional and Interregional Development Strategies related to Industrial Policy.



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# Industrial Areas (IA)s in Greece

- ETVA VI.PE. is a bank-controlled supervising authority body which manages 32 IAs (27) and Entrepreneur Areas (5) all over Greece and offers services to the companies hosted by them.
- There are also some IAs and Entrepreneur Areas in Greece which are not managed by ETVA VI.PE.

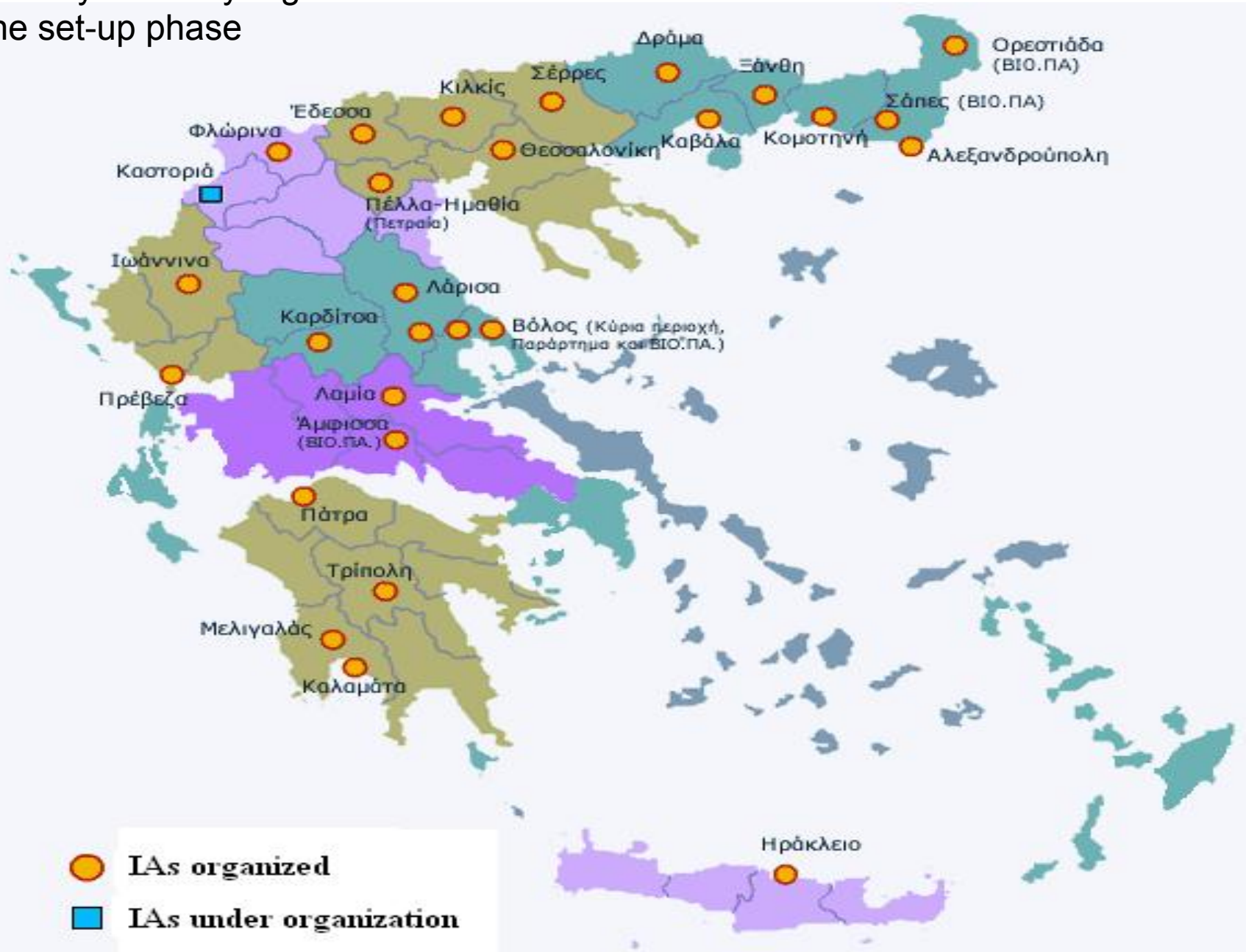
Location	Status	Operation body
Thessaloniki	In operation	IA Thessaloniki. S.A.
Keratea	In operation	IA Keratea S.A.
Chania	In operation	IA Chania S.A.
Rethimno	Under construction	IA Rethimnou S.A.
Litochoro		-----
Farkadona		IA Farkadona S.A.
Koufalia		-----
Zervochoria		AN. ET. XA. S.A.
Serres		IA Serres S.A.
Ptolemaida	In operation	IA Ptolemaida S.A.
Kastoria	Under construction	-----
Agios Nikolaos		
Ormenio		
Arkalochori		
Anopoli Herakleio	In operation	
Glauko Patras	Under construction	IA Glaukou S.A.
Astakos	In operation	Akarport S.A.
Lakkoma Chalkidiki		-----

# ETVA VI.ΠΕ.: IAs in Greece supervised by ETVA VI.ΠΕ.

- 27 IAs already basically organized
- 1 IA in the set-up phase



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# IAs in Greece (Mourtsiadis, 2010)

Name (Location)	Year of foundation	Total area (acr)	Number of businesses	Percentile of fullness	HazWst generated	
A/A	Όνομα Βιομηχανικής Περιοχής (θέση)	Έτος ίδρυσης	Συνολική έκταση (στρ)	Συνολικός αριθμός επιχειρήσεων στη ΒΠΠΕ	Ποσοστό πληρότητας (%)	Περιπτώσεις επιχειρήσεων που παράγουν επικίνδυνα απόβλητα (ΕΑ)
1	Θεσσαλονίκης	1965	9400	569	100	ΝΑΙ
2	Βόλου-Κύρια	1966	2759	131	100	ΝΑΙ
3	Ηρακλείου	1969	1723	284	100	ΝΑΙ
4	Πατρών	1972	4104	82	57	ΝΑΙ
5	Βόλου-Παράρτημα	1972	1734	30	68	ΝΑΙ
6	Φλώρινας	1975	1105	15	35	ΟΧΙ
7	Δράμας	1975	2155	73	41	ΟΧΙ
8	Ξάνθης	1975	1542	30	42	ΟΧΙ
9	Ιωαννίνων	1976	2058	150	54	ΝΑΙ
10	Κομοτηνής	1976	4342	142	72	ΝΑΙ
11	Καβάλας	1977	2080	53	28	ΝΑΙ
12	Πρέβεζας	1978	2012	45	45	ΟΧΙ
13	Σερρών	1978	1239	52	47	ΟΧΙ
14	Λάρισας	1979	2415	70	30	ΝΑΙ
15	Κιλκίς	1979	1612	48	77	ΝΑΙ
16	Λαμίας	1979	1625	55	55	ΝΑΙ
17	Αλεξανδρούπολης	1980	1072	20	50	ΝΑΙ
18	Τρίπολης	1981	1600	90	53	ΝΑΙ
19	Καλαμάτας-Σ	1983	251	12	15	ΟΧΙ
20	Καλαμάτας-Μ	1983	1081	17	17	ΟΧΙ
21	Αστακού	1984	1722	-	-	-
22	Έδεσσας	1984	572	4	20	ΟΧΙ
23	Αργοστολίου	1986	120	80	100	ΟΧΙ
24	Πετραίας	1986	1931	-	-	-
25	Θήβης	1987	3987	2	45	ΟΧΙ
26	Καρδίτσας	1990	660	-	-	-
27	Κοζάνης	1997	709	-	-	-
<b>Σύνολα</b>			<b>55590</b>	<b>2054</b>		



- The methodology was based on the structure of an appropriate questionnaire focussed on SWOT (Strengths – Weaknesses – Opportunities - Trends) analysis, for the examination of existing conditions related to IAs in a region. The aims of this questionnaire were:
  - To detect risks and difficulties in the implementation of a **Sustainable Industrial Area** (SIA) model;
  - To identify the “state-of-the-art” of the SIA concept;
  - To determine the Best Practice for SIAs



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- The questionnaire was divided in six sections:
  - Section 1: General profile of the IA
  - Section 2: Legislative framework
  - Section 3: Planning rules for the IA
  - Section 4: Environmental management of IAs
  - Section 5: Infrastructure and centralized services
  - Section 6: Environmental and Architectural quality of the industrial buildings
- Expected outcome: to perform a SWOT analysis in 3 aspects:
  - Environmental
  - Social
  - Economical





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- The questionnaire was released to various related stakeholders:
  - IA management bodies
  - Federations/Associations
  - Municipalities in a close distance from IAs

Sectors	Public	Private
Management bodies of IAs (i.e. ETVA VIPE, VIPATHE)		X
Local Authorities	X	
Federation of Industries of Northern Greece		X
Association of Industries in Thessaly and in Central Greece		X
Federation of Peloponnese & Western Greece Industries		X
Hellenic Federation of Enterprises		X
Athens Chamber of Commerce and Industry		X
Governmental institutions (i.e. ministries)	X	



## Preliminary results

- SWOT Analysis of Sindos IA only in an environmental aspect

<p style="text-align: center;"><b><u>Strengths</u></b></p> <ul style="list-style-type: none"><li>▪ Large IA with settled waste management infrastructure (2 MRF and 2 WTP).</li><li>▪ Located close to national roads.</li><li>▪ Existing infrastructure providing social services.</li><li>▪ Existence of several licensed recycling/recovering plants.</li><li>▪ Existence of several hazardous waste transportation plants.</li><li>▪ Existence of several projects conducted related to proper management of hazardous waste.</li></ul>	<p style="text-align: center;"><b><u>Weakness</u></b></p> <ul style="list-style-type: none"><li>▪ 314 different types of industries</li><li>▪ Located in a close distance to a big city.</li><li>▪ Lack of up-to-date hazardous waste inventory.</li><li>▪ Lack of recycling schemes for every hazardous waste stream.</li><li>▪ Unawareness of the potential hazardous waste generators.</li><li>▪ Existence of unregistered industrial facilities</li></ul>
<p style="text-align: center;"><b><u>Opportunities</u></b></p> <ul style="list-style-type: none"><li>▪ Existence of available EU funds.</li><li>▪ Existence of qualified staff in Greece.</li><li>▪ Development of clean production technologies globally.</li></ul>	<p style="text-align: center;"><b><u>Threats</u></b></p> <ul style="list-style-type: none"><li>▪ Public reaction against the establishment of new hazardous waste facilities.</li><li>▪ Incompliance to EU regulations because of the improper management of hazardous waste.</li></ul>



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## Environmental performance

- PCA was performed in an environmental aspect
- Common characteristics of the IAs
- Criteria:
  - WWT
  - Special WWT
  - WTE
  - MRF
  - CDS
  - CMS

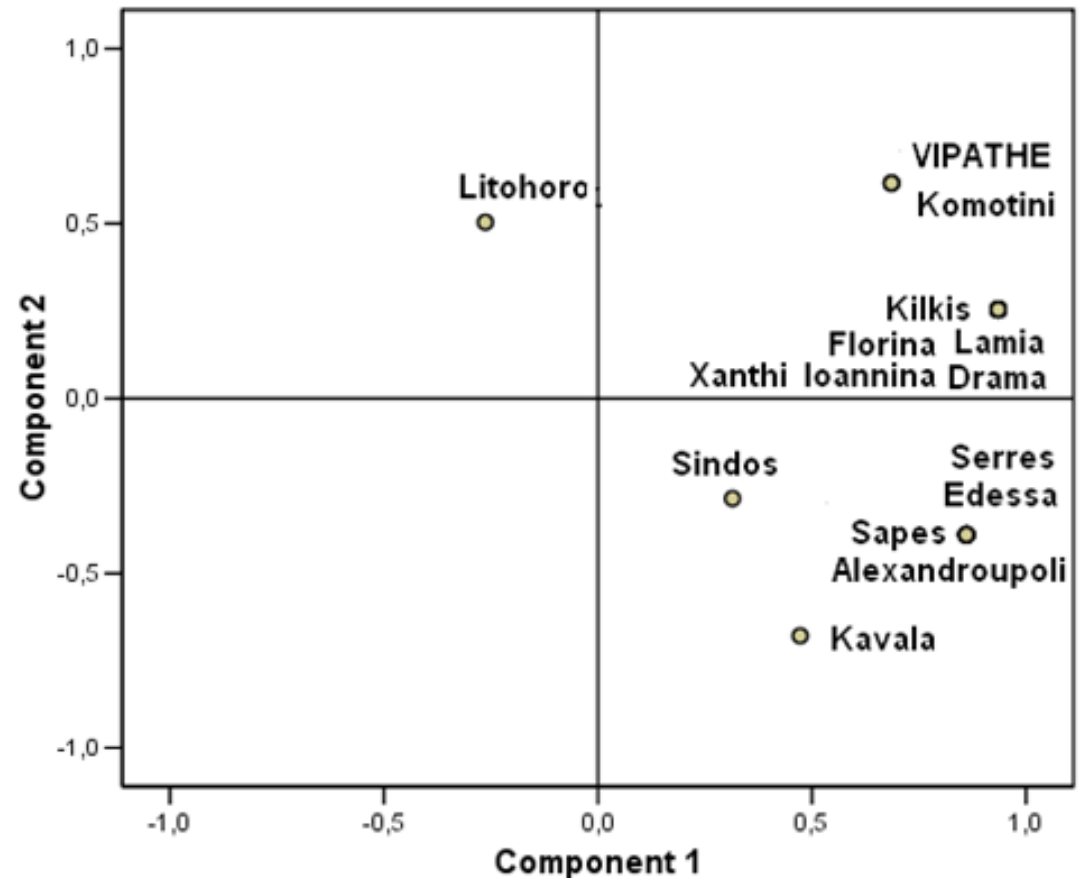
WWT: Waste Water Treatment plant

WTE: Waste To Energy

MRF: Material Recovering Facility

CDS: Central Drainage System

CMS: Central Monitoring System





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## Environmental performance



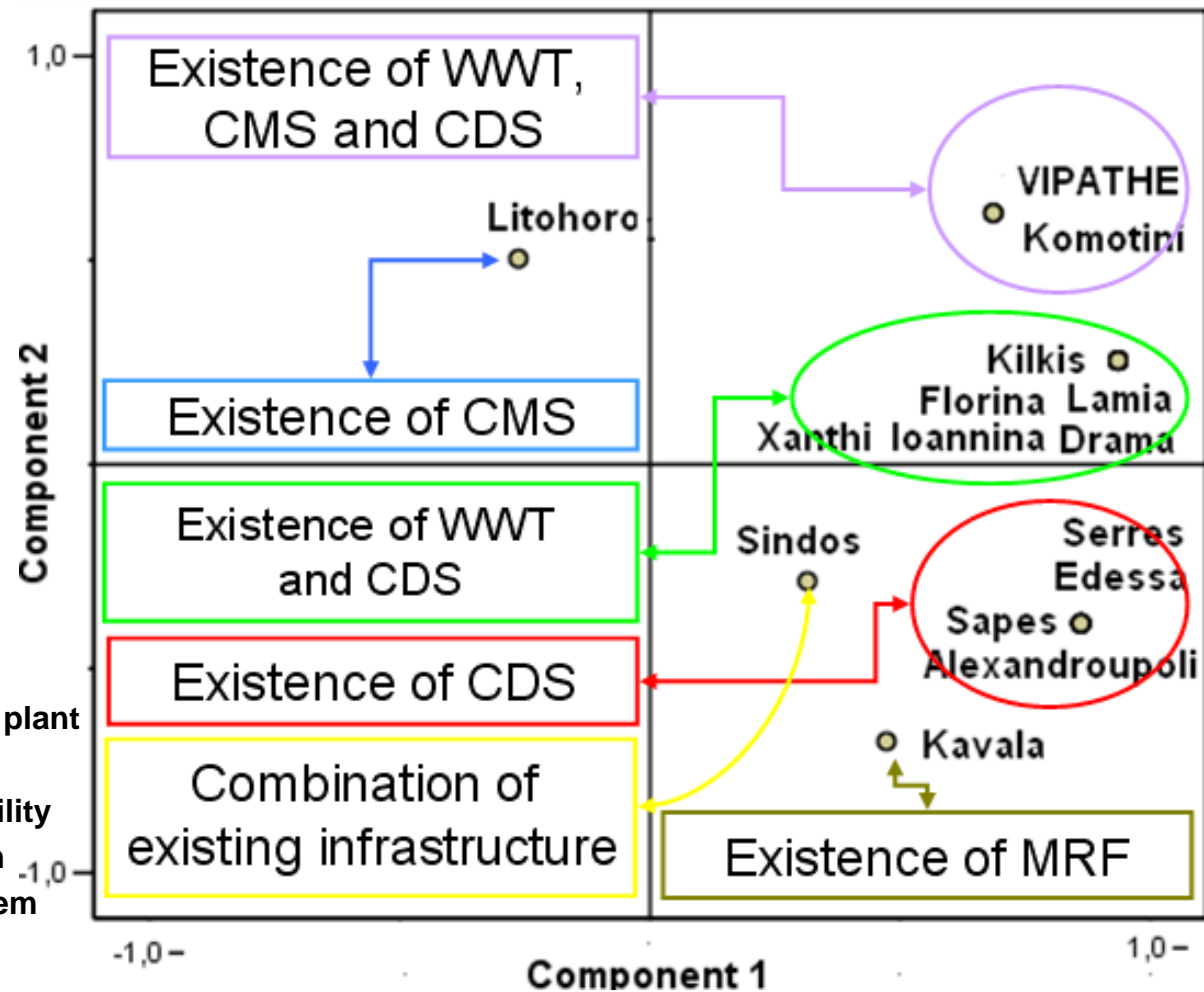
- Infrastructure (qualitative data)
- Transformation qualitative data to quantitative
  - Existence of infrastructure = 1
  - Lack of infrastructure = 0
- Formulation of appropriate database consisted by 0,1 in Microsoft Excel®
- Investigation of the data correlations



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# Preliminary results-Environmental performance

- Outcome: 'classifying' the gathered data



## Acronyms:

WWT: Waste Water Treatment plant  
WTE: Waste To Energy  
MRF: Material Recovering Facility  
CDS: Central Drainage System  
CMS: Central Monitoring System

- 15 IAs were classified according to their infrastructure

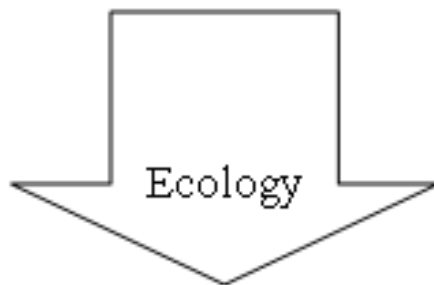


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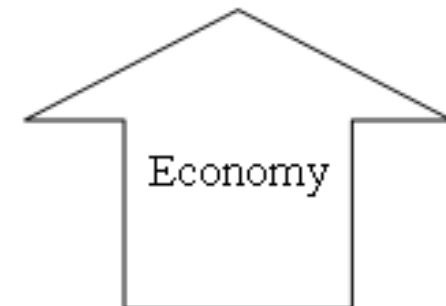
## Industrial Symbiosis (IS)

- IS can be defined as sharing of services, utility, and by-product resources among industrial actors in order to add value, reduce costs and improve environment.
- IS is a subset of industrial ecology, with a particular focus on material and energy exchange.



Decrease pollution and waste

+



Increase business success



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## Conclusions - Recommendations

- The aforementioned analysis for the whole Hellenic IAs proved that it is needed internal cooperation and communication among the industries.
- Modeling and optimization of the industries inside IAs by the means of an Input/Output analysis following the frame set by National and regional Laws in order to:
  - have positive impact on use of resources by industries and emissions and residuals savings.
- Establishment of an appropriate internal network for sustainable management of industrial solid residuals:
  - communication/cooperation among industries inside IAs so as residuals of industries will be used from other industry (after pre treatment).





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# Acknowledgements

- Mediterranean Eco-Industrial Development (MEID project)
- MEID website: [www.medmeid.eu](http://www.medmeid.eu)

Project co-financed by the European Regional Development Fund

MEDITERRANEAN MODEL FOR PLANNING, CONSTRUCTION AND MANAGEMENT OF INDUSTRIAL AREAS

HOME PARTNERS THE PROJECT EVENTS & MEETINGS CONTACTS GALLERY

### PROJECT OBJECTIVES

M.E.I.D. – Mediterranean Eco Industrial development is an initiative co-financed by the Programme Med and the European Regional Development Fund. MEID aims at realizing the Mediterranean Eco Industrial Development model facilitating and enabling planning, building and governing sustainable Industrial Areas (IAs).

The MEID project goals to enhance capacities and decision tools of Competent Authorities to integrate environmental friendly solutions into the Regional and Interregional Development Strategies related to Industrial Policy. The European and Mediterranean SMEs will be the first beneficiaries of MEID, in terms of fostering eco-innovation, competitiveness and transnational cooperation.

### EVENTS CALENDAR

TODAY MARCH 2011						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31	1	2
3	4	5	6	7	8	9

### NEWS AND ANNOUNCEMENTS

### MEID Mediterranean Eco-Industrial Development

Med. Strengthening Innovation capacities Objective 1.1: Dissemination of Innovative Technologies and know-how

**Key data:**

- Med programme
- Total budget: 1,224,75 €
- ERDF contribution: 558,522 €
- Duration of the project: 01.07.10 – 30.06.13
- Partners:
  - ENEA - Italian National Agency for New Technologies, Energy and Sustainable Economic Development (Italy), Lead Partner;
  - Aristotle University of Thessaloniki (Greece)
  - EPX/NI PCU, Local Authorities Network for Social, Cultural, Tourist, Environmental and Agricultural Development (Greece)
  - SKEMA Business School (France)
  - Fetic Foundation (Italy)
  - Fundación Labor Social (Spain)
  - Tami Zennir Foundation (Italy)
  - AD Ragusa - Consortium for the Industrial Development Area of Ragusa (Italy)
  - Fundación INTRASCO (Spain)
  - Fundación Comunitat Valenciana Regió Girona (Spain)
  - Business Service Centre of Government of Zakynthos (Greece)
  - Centro (Greece) and Haragorta (Spain)

**Main objective:** MEID aims at realizing the Mediterranean Eco-Industrial Development model facilitating and enabling planning, building and governing sustainable Industrial Areas (IAs). MEID project goals are to enhance capacities and decision tools of Competent Authorities to integrate environmental friendly solutions into the Regional and Interregional Development Strategies related to Industrial Policy.

**Main beneficiaries:** The European and Mediterranean SMEs will be the first beneficiaries of MEID, in terms of fostering eco-innovation, competitiveness and transnational cooperation.

**Main project activities:** SWOT analysis of IAs: starting from the exploitation of previous experiences, project partners will present their procedures and construction rules for new Industrial Areas, putting in evidence the environmental, economical criticisms and strengths. Project partners will share their SWOT results to identify the traditional model weaknesses and to propose innovative technology, process and materials. The "opportunities" at European level, available Best Available Technologies (BAT) related to buildings will be analyzed. A set of internal round tables on SWOT will be organized. MEID model Definition: MEID Model will be developed as a decision support system for local authorities to define the IAs location, the area size, the general plan, taking into account mobility, resources, energy and waste management. It will include rules definition for industrial building in order to cover the lack of focus on sustainability in the industrial buildings, which present specific characteristics from residential buildings. Two transnational technical meetings will be organized involving external experts. Validation and Pilot test: The model test will provide indications for improving sustainable standards of IAs and validate the rules to follow in the planning phase. SMEs of sustainable construction, energy, recycling sectors will be involved. Competent Authorities will provide recommendation to integrate into their regional programmes indications to incentive the introduction of proposed rules. The foreseen pilot areas are: Apulia (Italy), Puglia (Italy) and Valencia (Spain). Component activities include training courses, meetings for pilot actions and transnational workshops for SMEs.

**Project Coordinator:** Mario Tarantini  
ENEA  
The Italian National Agency for New Technology, Energy and Sustainable Economic Development

**Hellenic representation:** Aristotle University of Thessaloniki

1. LGICT-Laboratory of General & Inorganic Chemical Technology, Chemistry Department. <http://www.ing.auth.gr/chem/igct/>
2. LHTEE-Laboratory of Heat Transfer and Environmental Engineering, Mechanical Engineering Department. <http://lx.meng.auth.gr/>

Partners logos: ENEA, SKEMA tecnalia, LGICT, LHTEE, bsc, if, etc.

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# Thank you for listening!

Avraam Karagiannidis