Case Studies of Resource Efficient Industrial Production in Turkey

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Multi-Stakeholder Meeting on the Future of Sustainable Business and Entrepreneurship in the Mediterranean

17 February 2012
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The concept itself is relatively recent and has been receiving growing attention since the 1990s.

Among the terms available to describe green entrepreneurship, the following are the most commonly used: ecoentrepreneurship, ecopreneurship, environmental entrepreneurship, sustainable entrepreneurship, ecological entrepreneurship, enviro-preneurship or sustainopreneurship.

The literature has not provided clear-cut answers to these questions. ✓ How can these concepts be operationalised? ✓ What activities could be included in the “green” part of entrepreneurship? ✓ What are the main characteristics of green entrepreneurs?

Defining green entrepreneurship is a difficult task.

COMMON THEMES IN DIFFERENT DEFINITIONS OF GREEN ENTREPRENEURSHIP

- Green or Environmental Sectors
- Entrepreneurship
- Sustainability
- Technological & social innovation
- Reduction of resource use
- Minimization of pollution and environmental risks
- Improvement of resource and cost efficiency
  etc*. 


“Environment-conscious entrepreneurs”, are individuals who develop any kind of innovation (product, service, process) that either reduces resource use and impacts or improves cost efficiencies while moving towards a zero waste target*


Products that represent an opportunity for the development of sustainable entrepreneurial solutions are efficient, non-toxic,…..

Efficient: products that require fewer resources to deliver a basic or enhanced functionality than existing alternatives. …Those opportunities create value both for the environment (reduced consumption of resources) as well as for the user (reduced cost of ownership);

Non-toxic: … The opportunity here is to aim for non-polluting or non-toxic products*. 

Green Entrepreneur (Allam, 2011)

- Integrates environmental, economic & social axis in core business
- Innovative solutions to the way goods and services are produced & consumed
- Scaling-up of the business model contributes to greening of the economy*.

Green Economy (UNEP)

For the purposes of the UNEP’s Green Economy Initiative a green economy results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one which is low carbon, resource efficient and socially inclusive**.

Green economy and sustainable consumption and production represent two sides of the same coin. In practice, work towards achieving a green economy and sustainable consumption and production are mutually supportive ***


SOME EXAMPLES WILL BE SUMMARIZED IN THE FOLLOWING SECTIONS.
United Nations (UN) Joint Programme

“MDG-F – 1680: ENHANCING THE CAPACITY OF TURKEY TO ADAPT TO CLIMATE CHANGE”

Total Budget: 7,000,000 $  
Project Duration: 3 years (2008-2011)  
Beneficiary: Ministry of Environment and Urbanization

Executing UN Agencies:
1. United Nations Development Programme (UNDP)  
2. United Nations Environment Programme (UNEP)  
3. United Nations Industrial Development Organization (UNIDO)  
4. Food and Agriculture Organization of the United Nations (FAO)

Beneficiary: Ministry of Science, Industry and Technology  
Pilot Regions: Seyhan Basin (Kayseri, Niğde, Adana)
UNIDO Eco-efficiency Programme

Aim of the Project

To foster the implementation of Eco-efficient (Cleaner) Production and Environmental Sound Technologies for the management of climate change risks at industrial sector.

Pilot Scale Projects: Water Saving

Priority Sectors: - Food/Drink,
- Chemical,
- Textile/Tannery,
- Metal/Machinery

Project Activities: Awareness raising, Capacity building, Trainings, Pilot projects, Guiding Documents, Booklets, etc.
UNIDO ECO-EFFICIENCY PROGRAMME

Project Team:

- United Nations Industrial Development Organization (UNIDO)
- Technology Development Foundation of Turkey (TTGV)

Project Consultant:

Prof. Dr. Göksel N. Demirer (METU)

Programme Duration

June 2008 – December 2011
Pilot Projects in the Selected Companies

Aim:
- Realize full-scale demonstration projects in the priority sectors so as to accumulate know-how and experience for national information and dissemination activities.
- Raise awareness and develop capacity on Eco-efficiency (Cleaner Production) concept.

Approach:
- Questionnaires, Company visits, Meetings
- Select companies from priority sectors (6 Company)
- General Selection Criteria
  - Priority sector, Willingness of the company, Eco-efficiency application potential etc.
Pilot Project Implementations

Six companies from five priority sectors in five different cities:

- Metal
- Food
- Chemical
- Textile
- Drink
**Eco-efficiency (Cleaner Production) Pilot Projects**

**Food and Beverage Sector**
- **Adana** - PAKYÜREK Tarım San. ve Tic. A.Ş.
- **Kayseri** - GÜLSAN Gıda San. ve Tic. A.Ş. (MEYSU)

**Metal Working and Machinery Sector**
- **Niğde** - DİTAŞ Doğan Yedek Parça İma. ve Tek. A.Ş.
- **Ankara** - BOSAN Boyama Ltd. Şti.

**Chemicals Sector**
- **Adana** - ADVANSA SASA Polyester Sanayi A.Ş

**Textile Sector**
- **Bursa** - ÖZEL TEKSTİL Sanayi ve Ticaret Ltd. Şti.
Methods and Tools

- **Environmental Performance Indicator (EPI)**
  - Consumption per unit production (water, energy etc.)
  - Consumption per unit raw material (water, energy etc.)

- **Benchmarking**
  - International literature and case studies
  - Best available techniques (BATs)

- **Raw Material Cost Analysis**

- **Material Flow Analysis**

- **Water Mass Balance**
  - Process based water consumption figures
  - Wastewater production figures
<table>
<thead>
<tr>
<th>Savings</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Water Saving</strong></td>
<td>784.550 m³/year (% 22)</td>
</tr>
</tbody>
</table>
| **Chemical Saving**     | 192 ton/year → NaCl  
7.7 ton/year → Thinner  
5.2 ton/year → Sodium Cynadie (NaCN)  
1.2 ton/year → Cadmium Oxide (CdO)  
1.7 ton/year → Other |
| **Energy Saving**       | 4.681.000 kWh → Natural gas (425.545 m³)  
265.970 kWh → Electricity |
| **Reductions in CO2 emissions** | 978 ton/year CO2 |
| **Cost Savings**        | 1.357.792 $  
Total Spent: 264.800 $  
Payback time: around 3 months |
| **Other Savings**       | • Improvements in production processes and product qualities  
• Reduction in process time  
• Labour Savings  
• Reduction in maintenance and repair  
• Reduction in wastewater treatment costs  
• Improvements in working environment  
• Savings in transportation costs  
• Elimination of noise problem |

For more information please visit: http://www.ecoefficiency-tr.org/
DETERMINATION OF THE FRAMEWORK CONDITIONS AND RESEARCH-DEVELOPMENT NEEDS FOR THE DISSEMINATION OF CLEANER (SUSTAINABLE) PRODUCTION APPLICATIONS IN TURKEY

T.R. MINISTRY OF ENVIRONMENT AND FORESTRY

IMPLEMENTING INSTITUTION

TECHNOLOGY DEVELOPMENT FOUNDATION OF TURKEY

CONSULTANT: Middle East Technical University

Prof. Dr. Göksel N. Demirer, Department of Environmental Engineering
Middle East Technical University, Ankara
Specific objectives of this project are;

- To present conceptual framework of the cleaner (sustainable) production approach,
- To determine the existing capacity on the cleaner (sustainable) production in our country,
- To determine the existing incentive mechanisms so as to induce the cleaner (sustainable) production in our country,
- To evaluate the legislation of our country with respect to the cleaner (sustainable) production and compare with the related EU legislations,
- To define the instruments to be used for the cleaner (sustainable) production inducement,
- To develop the suggestions regarding to necessary legislative framework to be used for the inducement of the cleaner (sustainable) production,
- To determine the priority sectors for the cleaner (sustainable) production in Turkey,
- To determine the Research-Development needs based on the cleaner (sustainable) production in Turkey.
This project is the first national scale investigation on the:

- Capacity
- Incentives
- Resources
- Legislation
- Research and development needs
- Priority sectors
- Etc.

on Cleaner (Sustainable) Production which is one of the core elements of Green Entrepreneurship.

For more information please visit:
http://www.ttgv.org.tr/tr/temiz-uretim
Industrial Symbiosis Project in Iskenderun Bay

BTC CRUDE OIL PIPELINE COMPANY

IMPLEMENTING INSTITUTION

TECHNOLOGY DEVELOPMENT FOUNDATION OF TURKEY

CONSULTANT: Middle East Technical University

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Middle East Technical University, Ankara
Industrial Symbiosis:

Two or more industrial operations form long-term partnerships to increase resource efficiency, environmental performance and competitiveness.

By-products or wastes generated by an enterprise can be used as raw material or resource for other enterprise.

Economical advantages can be provided besides prevention of industrial environmental problems.

Benefits of IS are:
- Enhancing raw material quality and minimize costs
- Energy costs minimization
- Waste processing and disposal costs minimization
- Development of new products
- Transportation and logistics costs minimization
- To achieve a richer idea and human resource pool
- To produce less waste
- To ease compliance with environmental law and regulations

Potential Areas of Eco-Industrial Networking

<table>
<thead>
<tr>
<th>Materials</th>
<th>Quality of Life/ Community Connections</th>
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<tbody>
<tr>
<td>common buying</td>
<td>integrating work and recreation</td>
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<tr>
<td>customer/supplier relations</td>
<td>co-operative education, opportunities</td>
</tr>
<tr>
<td>by-product connection</td>
<td>volunteer and community programs</td>
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<tr>
<td>creating new material markets</td>
<td>involvement in regional planning</td>
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<tr>
<th>Transportation</th>
<th>Energy</th>
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<tr>
<td>shared commuting</td>
<td>green buildings</td>
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<tr>
<td>shared shipping</td>
<td>energy auditing</td>
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<tr>
<td>common vehicle maintenance</td>
<td>cogeneration</td>
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<tr>
<td>alternative packing</td>
<td>spin-off energy firms</td>
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<tr>
<td>intra-park transport</td>
<td>alternative fuels</td>
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<tr>
<th>Human Resources</th>
<th>Marketing</th>
</tr>
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<tbody>
<tr>
<td>human resource recruiting</td>
<td>green labelling</td>
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<tr>
<td>joint benefit packages</td>
<td>accessing green markets</td>
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<tr>
<td>wellness programs</td>
<td>joint promotion</td>
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<tr>
<td>common needs (payroll maintenance, security)</td>
<td>joint ventures</td>
</tr>
<tr>
<td>training</td>
<td>recruiting new value-added companies</td>
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<td>flexible employee assignment</td>
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<tr>
<th>Information/ Communication Systems</th>
<th>Environment/ Health/Safety</th>
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<tr>
<td>internal communication systems</td>
<td>accident prevention</td>
</tr>
<tr>
<td>external information exchange</td>
<td>emergency response</td>
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<tr>
<td>monitoring systems</td>
<td>waste minimization</td>
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<tr>
<td>computer compatibility</td>
<td>multimedia planning</td>
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<tr>
<td>Joint EMS system for Park Management</td>
<td>design for environment</td>
</tr>
<tr>
<td></td>
<td>shared environmental information systems</td>
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<td></td>
<td>joint regulatory permitting</td>
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<tr>
<th>Production Processes</th>
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<tbody>
<tr>
<td>pollution prevention</td>
<td></td>
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<tr>
<td>scrap reduction and reuse</td>
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<tr>
<td>production design</td>
<td></td>
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<tr>
<td>common subcontractors</td>
<td></td>
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<tr>
<td>common equipment</td>
<td></td>
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<tr>
<td>technology sharing and integration</td>
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Box 3: Cohen-Rosenthal 1999
The specific objectives of the project are as follows:

- Establishment of a technical and administrative infrastructure for implementing IS applications
- Development of IS opportunities and pilot applications in Iskenderun Bay
- Creation of a database and communication network in Iskenderun Bay for IS applications
- Dissemination of IS applications and strengthening the communications among stakeholders
- Preparation of a National IS Programme implementation model and plan

For more information please visit:

http://www.endustriyelsimbiyoz.org/
THANK YOU

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