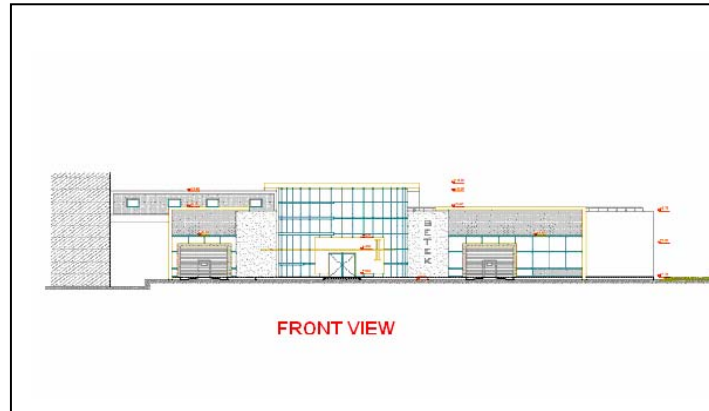


# 1<sup>st</sup> INTERIM REPORT

(Previous Name: BETEK Training and R&D Center, Turkey)

New Name - Turkish: "RMI Türkiye Bilimsel Araştırma ve Geliştirme Merkezi  
(RMI Türkiye)"

New Name - English: "RMI Turkey Scientific Research and Development Center  
(RMI Turkey)"



## IN THE FRAMEWORK OF THE MED-ENEC PROJECT

– ENERGY EFFICIENCY IN THE CONSTRUCTION SECTOR  
IN THE MEDITERRANEAN –

**Date: 08 June 2007**

**Consortium Partners:**

R&R Bilimsel ve Teknik Hizmetler Ltd. Şti. and BETEK Boya ve  
Kimya San.A.S., Istanbul, Turkey

## I THE PILOT PROJECT

### PROJECT INFORMATION

|                     |  |                |
|---------------------|--|----------------|
| Reference number    | TUR01  |                |
| Country             | Turkey   |                |
| Location/City       | Gebze / Kocaeli  |                |
| Address             | Inonu Mah. Guzeller Mevkii. GOSB                           |                |
| Building Type       | Training and R&D Center                                    |                |
| Number of Buildings | 1 building with 3 floors constructed on a 800 m2 base area |                |
| Total Floor Space   | 1763 m <sup>2</sup> (total)                                | m <sup>2</sup> |

### CONSORTIUM

|                     |   |
|---------------------|---|
| Partner number      | 1   |
| Partner name        | R&R Bilimsel ve Teknik Hizmetler Ltd. Şti.  |
| Role in the Project | Lead partner  |
| Address             | Sırmaperde Sok. No:69 A/3 Altunizade Üsküdar İstanbul   |
| Country             | Turkey  |
| Contact Person      | Prof. Dr. Ali Beba  |
| Phone               | Prof. Dr. Ali Beba  |
| Fax                 | +90 216 651 2182  |
| Email               | +90 216 651 2194  |
|                     | <a href="mailto:info@rrbilimsel.com.tr">info@rrbilimsel.com.tr</a>  |
| Partner number      | 2   |
| Partner name        | BETEK Boya ve Kimya San.A.S.  |
| Role in the Project | Building Owner  |
| Address             | Inonu Mah. Guzeller Mevkii. GOSB Gebze / Kocaeli  |
| Country             | Turkey  |
| Contact Person      | Mr. Sinan Ustunel / Mr. Mustafa Macit   |
| Phone               | +90-262-678-3000  |
| Fax                 | +90-262-678-3215  |
| Email               | <a href="mailto:sinan.ustunel@betek.com.tr">sinan.ustunel@betek.com.tr</a> / <a href="mailto:mustafa.macit@betek.com.tr">mustafa.macit@betek.com.tr</a> |

## II SUMMARY OF THE PROJECT

### ABSTRACT

Main energy features of the Turkish Pilot Project, named as "RMI Turkey Scientific Research and Development Center (RMI Turkey)", are:

- Conservation of energy by utilizing the most adequate thermal insulation material with 8 cm thickness
- Utilization of renewable energy source via Ground to Surface Heat Pumps (GSHPs),
- Increase the input of the natural light in the building by two skylights (190 m<sup>2</sup>)
- Higher utilization of passive solar energy by orienting building architecture to sun

Cost of the new energy system is estimated to be around 260,000 Euro versus 175,000 Euro calculated for the conventional system. Simple pay - back period of the selected energy system was calculated to be 9.4 years with 15,537 U.S. Dollars of net present value for 20 years of life span making this project economically feasible.

## THE PILOT PROJECT

"RMI Turkey Scientific Research and Development Center (RMI Turkey)", consists of approximately 1763 square meters of total area with three floors, a seminar hall, several laboratories, office spaces and application areas. It is located at the Betek manufacturing facility site in Gebze Organized Industrial Zone, Kocaeli Turkey. Building will be used throughout of the year for scientific and technical investigation of new building materials and for training purposes.

## THE ENERGY CONCEPT

- a) Conservation of energy: To reduce the heating and cooling demand of the building improved insulation compared to the national standard will be implemented. This will be accomplished by utilizing 8 cm thick carbon containing insulating material.
- b) Use of renewable energy source for meeting the heating & cooling needs: A heat pump system, which utilizes ground as the constant temperature heat source is the main renewable energy source. A vertical closed loop system with 22 double-U bore-holes, each with 100 meters depths are drilled to provide the energy demand. A total of 27 ground source heat pump (GSHP) units will be used to distribute this energy throughout the building.
- c) Increase the input of natural light into the building: This is accomplished by installing two skylights, with a total area of 190 m<sup>2</sup>, at the roof of the building. It is estimated that around 90 % of the lighting needs will be met this way for the halls during whole year. In addition, use of a solar light system (which has the commercial names of "Brighten Up®" and industrial type "Solamaster®") is planned to be used in order to meet part of the lighting needs of the bottom (darker) part of the building.
- d) Architectural setting and orientation of the construction is realized for the solar gain to be maximum in winter, while glare and solar gain are minimum in the summer. If necessary, a shading over the skylights will be considered.

## BENEFITS OF THE PILOT PROJECT

Calculations showing the benefits over the life-span of 20 years are summarized below

|              | New System | Unit | Conventional System | Unit |
|--------------|------------|------|---------------------|------|
| Summer       | 51824      | kWh  | 71520               | kWh  |
| Winter       | 62470      | kWh  | 19650               | kWh  |
|              |            |      | 162696              | kWh  |
| <b>Total</b> | 114294     | kWh  | 253866              | kWh  |

(15191 kg-oil equivalent electricity: 10,71 kWh/kg-oil)

|                                    |        |                |
|------------------------------------|--------|----------------|
| <b>Annual Energy Savings:</b>      | 139572 | <b>kWh/yr</b>  |
| <b>Annual Energy Savings:</b>      | 11166  | <b>Euro/yr</b> |
| <b>Additional Investment Cost:</b> | 96870  | <b>Euro</b>    |
| <b>Pay Back Period:</b>            | 8,68   | <b>Yr</b>      |

It is important to note that 9.4 years represent the worst case scenario since it does not take into account the benefits of the passive solar system plus the reduction of the lighting need due to the skylights (roof windows). When all these are taken into account, payback period is expected to be somewhat reduced.

## **STATUS OF THE PILOT PROJECT**

Planning of the project is totally completed. Over 90 % of the construction together with the 8 cm insulation is finished. Energy production and distribution system is fully defined and the necessary equipment is already purchased and brought to the site. Building is expected to be operation by end July 2007. An official opening is planned fro 18 October 2007. Monitoring strategy is clarified yet the information dissemination strategy is under discussion.