

# BUILDING GREEN IN SAKHNIN

Green building in Sakhnin/photo: Ryad Dwere



A green building, initiated by the Towns Association for Environmental Quality Agan Beit Natufa, will serve as a model for energy conservation and environmental research in the Galilee

The news couldn't have been better. Out of 31 pilot project initiatives submitted to the MED-ENEC competition on energy efficiency in the construction sector, the Green Building Project submitted by the Towns Association for Environmental Quality (TAEQ) Agan Beit Natufa in Sakhnin ranked first.

Exciting things have been happening in the Towns Association for Environmental Quality in recent years. Established in 1993 in the Lower Galilee city of Sakhnin, TAEQ was the first regional environmental unit in the Arab sector, serving seven Arab villages and towns. Today, the Association is renowned for spearheading environmental projects that have played

a key role in increasing public awareness and involvement in environmental issues. Concentrating on such issues as water and energy conservation, wastewater treatment and reuse, air pollution prevention and environmental planning, TAEQ is dedicated to promoting a rich diversity of environmental projects including joint environmental projects as a means of promoting Arab Jewish coexistence, creating a center for environmental education and international cooperation on advanced wastewater treatment in rural areas (supported by the EC LIFE Third Countries Project), and, most recently, upgrading a green building that will serve as a model for energy conservation and environmental research.

## Green Building: Integrating Traditional and Modern Elements

The green building project is integrated in a pioneering initiative to establish a 100,000 m<sup>2</sup> ecological village in Sakhnin, which will be dedicated to promoting sustainable development in the region. The two-story green building, which will serve as an office building, an educational center and a research and implementation center for green building technologies, will be at the heart of this environmental village, which already attracts about 50 thousand visitors per year.

The existing green building was designed according to energy saving architectural principles, many of them inspired by traditional Mediterranean architecture (e.g., large internal central yards, thick, insulated double walls of the building's envelope, cooling towers - *malkafs*, natural light bulbs - *tisanes*, shades - *mashrabias*, domes, vaults, etc.). The effectiveness of these energy conserving elements, which were incorporated into the design and architecture of the



building, has been investigated by local students and researchers during each season of the year. All of the elements were found to significantly impact on the energy consumption of the building. In fact, the overall energy savings of the existing green building as compared to conventional buildings with equivalent functions was found to be 72% during a one and a half year monitoring project (supported by the Chief Scientist of the Ministry of Environmental Protection).

Alongside these traditional building elements, the building, which was designed by Architect Abdelrahman Yassen, exemplifies important environmental principles dealing with energy conservation, water conservation, use of local and recycled material, all of which contribute to reducing building and maintenance costs. Furthermore, the building was constructed using natural local building materials such as local stones, soil, straw and stabilized lime, similar to the traditional construction that has characterized the area. Planning and construction were adapted to the topography and are based on wind flow and sun angle.

### Upgrading the Energy Efficiency of the Green Building

The pilot project, supported by MED-ENEC, aims at upgrading the energy efficiency of the building by adding passive architectural solar heating elements, electricity producing elements (photovoltaic and wind turbine), solar water heating, and numerous energy saving appliances and instruments (e.g. energy saving light bulbs, wise on/off light switches, wise and remote control ceiling window operators, etc.). The most important element in the pilot project will be the addition of solar heated sunspaces enclosed by solar heating walls or roofs, with the potential to reduce the need for external heating energy sources in winter to zero!

The basic concept of the project is to achieve full energy independence of the green building (zero or close to zero utilization of energy produced from fossil fuels), in accordance with four stages:

- ✿ Design of a green building that conserves energy through the integration of architectural energy saving design and technological energy saving devices.
- ✿ Addition of energy saving elements based upon solar heating systems and wind cooling systems.
- ✿ Addition of electricity generating units (photovoltaic, wind turbines), operating in complementary hours to supply the relatively small amount of energy required for purposes other than air conditioning.
- ✿ Grid electricity back up for peak hours, for days with low radiation and low wind.

This integration of elements, backed up by grid electricity, is expected to supply urban areas the optimal combination of

energy independence, environmental sustainability and economic feasibility.

### Expected Benefits of the Green Building

Numerous benefits, environmental, economic and social, are expected from this green building, from easy maintenance and low construction costs to efficient energy and water utilization to community and regional participation and involvement.

The actual importance of the project, however, goes much beyond the economic value of the energy savings that will be gained by installing the various elements. The main benefit of the proposed project is establishment of the required infrastructure for a demonstration and training center that will disseminate the green building design principles by future educational and R&D activities. With some 50,000 annual visitors and the ever growing educational activities of the TAEQ, the dissemination of green building design principles and methodologies is the most important benefit of the proposed project.

### The Green Building Project: Facts and Figures

- > Total annual energy consumption of the green building today is 68,000 kWh/yr in comparison to 246,000 kWh/yr estimated for conventional building. This represents a 72% reduction in total annual energy consumption obtained after 1.5 years of operation according to green building principles.
- > Total annual energy consumption is expected to reach a calculated value of 19,000 kWh/yr (92% overall saving compared to conventional building) after implementation of the pilot project.



Building workshops using local stone / photo: Riyadh Dweire

