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Opportunities for Green Construction and Energy Efficient products, materials, technology and services in Romania and the Central Eastern European region

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Executive Summary

Mandated European Union commitments, improving government capability, and increasing interest of leading investors, real estate developers and tenants/occupants in achieving greater energy efficiency and environmental responsibility have contributed to a significant increase in the market for green construction in Romania and the surrounding region. Opportunities exist to take a market leadership position for products, materials, technologies, expertise and other service providers across all aspects of the green industry. The need for improved energy efficiency, water efficiency/quality, recycling/waste management, or the marketing and development of solar or wind energy systems, energy efficient geothermal HVAC systems, low-VOC chemical products and other green construction solutions present a significant opportunity for Romania and for the region.

Introduction

Within the recent past, the following trends have converged to create significant opportunity for “green” development - including construction and eco-efficiency - in Romania and the surrounding region:

- increasing competition for existing fossil fuel reserves and falling (or eliminated) energy subsidies and the resulting rising energy prices
- unprecedented international political and business enthusiasm and demand for securing reliable sources of energy, reducing dependence on unstable suppliers of oil and combating climate change.
- scarce natural resources leading to significantly higher prices for a variety of construction inputs
- demonstrated investor interest in green building certification schemes
- mandated green procurement targets currently implemented
- falling prices for eco-efficient building solutions
- significant EU Funding for sustainable development (4.5 Billion Euros allocated between 2007 and 2013 for Environmental initiatives in Romania alone) and a general allocation of 30 Billion Euros to Romania for "Structural Funds" to improve infrastructure, competitiveness, governance, etc.
- Relaunch of the suspended “Green Home” initiative providing subsidies for integrating renewable energy solutions into apartments and businesses.
- greater willingness of financial institutions to consider total life-cycle costs in approving project financing
- relatively recent introduction of mortgage lending and other forms of construction financing that makes available more purchasing power when planning and designing homes and buildings for better energy efficiency.
- implementation in Romania and other member states of the mandatory European Energy Performance Building Directive (EPBD) requiring energy certification for new (2007) and existing (2010) buildings

These trends have converged to create a unique opportunity in developing regions, particularly Romania, where needs for rapid solutions and immediate improvements are critical to long term sustainability and competitiveness. The need for cost-effective, energy-efficient green development in Romania is uniquely suited to innovative businesses and construction firms, who have pioneered the development of the green industry and the institutionalization of green practices within government agencies, public institutions, and throughout the design and construction industry. There are at least six large real estate developers constructing buildings using either the US Green Building Council's LEED certification or the Building Research Establishment's BREEAM standard¹. Importantly, Large U.S. and European Real Estate Funds have begun funding buildings in Romania conditioned on achievement of one of the aforementioned certifications. In addition, all building owners/developers will be required to produce, at time of sale, an energy certificate that indicates the results of an energy audit.

As noted in many real estate development journals, Romania is not immune from the current global economic difficulties but presents a strategic opportunity for the future . There is concern for the 2009 and 2010 project pipeline as financing and speculative interest has receded. Romania has, however, been and is projected to be a strong performer in the central and eastern European region because of the size of the Romanian market (22 million), its strategic location, the projected required new construction (500K to 800K new housing units) and renovation to replace substandard apartment blocks and because it represents a platform for the region... including Bulgaria, Moldova, Ukraine, Georgia, Serbia, etc., where similar problems exist.

Market trends for construction market opportunities in Romania

- For the overall construction market, 2008-2009 will be slower considering global economic events and new stricter lending conditions announced by the central bank. Nevertheless, strategic companies are continuing with planned investments with green RE developments increasing six fold from 2007. The government has recently relaxed lending conditions but not to the level seen prior.
- Alignment of Romanian codes and practices with EU requirements (currently the European Commission is further strengthening its energy efficiency targets for all member states) has made it difficult for sub-standard construction companies and project developers to compete.
- There is a lack of experienced personnel in the implementation of large construction and infrastructure projects that utilize higher performing solutions. This is, however, expected to be mitigated by the return of migrant workers who have gained substantial experience in Western Europe construction activity.
- Anecdotally, developers in 2009 are looking back toward the city center as prices fall and opportunities present themselves that provide greater certainty of prospective buyers.
- The Romania Green Building Council has received a significant increase in inquiries and request for assistance in building green or certified green buildings. The level of knowledge of the concept of green building is increased significantly through increasing media coverage of the concept and by awareness building events.

¹ Supported in Romania by BRE International

Complexity of the problem

In general, the primary environmental problems in Romania are of a systemic nature. Energy or manufacturing production and consumption is related to building performance, air quality, water quality, waste management, and noise pollution. The inefficiency of centralized heating and power systems, and the aging infrastructure and building stock across all industries in Romania is well documented. Furthermore, the inter-relationships of the problems are complex, and coordination of improvements or changes between related systems has not been consistent. Consequently, significant environmental improvements may require systemic solutions as well as synergy across a number of environmental concerns. Improvements to energy production or consumption may need to be combined with improvements to buildings, waste management systems, water quality systems, noise reduction measures, or air quality systems in order to create sustainable improvements in Romania.

- Therefore, the "professionalization" of many industries is needed in order to develop systemic approaches to development and construction practices. An opportunity exists for training-service providers for training and educational development, as well as engineering and equipment controls services, funded by EU structural funds (where human resource improvement via training is a priority target for funds). There is also funding available for implementation of solution for renewable energy production.
- Considering that Romania has to fulfill its commitments to the EU in the area of Renewable Energy Sources (RES) - assuring that by 2010 33% of the total energy consumption in Romania will be produced by renewable energy sources- there are significant opportunities in the market for RES. Public authorities estimate that by 2015, 2.7 billion euros will be spent for RES.
- The public funding that will be available in the next year will be spent mainly on projects related to:
 - water quality and infrastructure
 - reducing air pollution
 - implementing efficient waste management systems
 - rehabilitation of existing district heating units
 - alternatives for district heating (there are plans for replacing the Large Combustion Plants with smaller and more efficient units)
 - production of energy out of RES
 - biodiversity
 - protection of natural areas including reforestation
 - training of employees in areas connected with environmental protection and better use of information technology.

Energy efficiency and renewable energy are topics present on the government's agenda and there are funds allocated for these areas. Regarding energy efficiency, the most important public program (that is not connected with the European funds) is focused on the refurbishment of old apartment blocks. In refurbishment projects the cost are covered 67% by public funds and – with the relatively recent access to bank financing - the remaining 33%

of costs is considerably more affordable to the apartment owner².

The “Casa Verde” or “Green Home” initiative was a funding scheme proposed in late 2008 by the then Ministry of Environment and Sustainable Development to provide 150 Million Euros to assist homeowners (primarily) and businesses integrate renewable energy solutions. The initiative was suspended in early 2009 but a relaunched program has been promised by the new Minister of the Environment and the President of the Environmental Administration Fund – caretaker of the funds and the program. The Romania Green Building Council has requested to provide guidance for the implementation rules of the program to ensure an effective, transparent, and successful initiative.

² An additional favorable development for the promotion of building renovations is a recent simplification of the process in which building associations that hold the power in each apartment building must only obtain 51% of the tenants agreement to undertake improvements such as a major refurbishment. Previously a near veto power could be exercised if a small minority of building owners did not want to undertake improvements.

Opportunities for immediate improvement

As has been noted by multiple sources, although policies are in place by various funding sources to encourage collaboration and synergy, the administrative and cultural aspects of creating collaborative teams and synergistic solutions for large-scale systemic problems are complex. Therefore, an intermediate measure, particularly for the current boom in building construction, may be the implementation of smaller-scale green construction practices which may over time develop synergy and create precedents for future construction. In short, a successful demonstration project may be the best approach to encourage significant change towards greener development.

Green Construction Opportunities

The following are opportunities³ resulting from green construction practices as promoted by BRE International using the BREEAM standard, the US Green Building Council using LEED as its primary assessing tool, and the Romania Green Building Council (RoGBC) that is promoting the comprehensive implementation European Performance for Buildings Directive (EPBD)⁴.

Energy efficiency:

- **Lighting:** The energy-efficient lighting industry - 1. Energy efficient lamps; 2. Energy efficient and lighting-efficient fixtures; 3. Energy efficient and lighting efficient lighting systems (coordination with day lighting and task lighting). – is currently under-represented and under-serviced in Romania for all except the biggest clients utilizing a direct contract with the biggest global suppliers. Starting in 2007, the EU encouraged all member governments to promote the use of energy efficient lighting and to be proactive toward all domestic lighting. However, the subject of modern lighting is complex, and affords service providers the unique opportunity to provide services and consulting for lighting design and planning for commercial applications, consulting and training for construction and facilities personnel, in addition to simply selling units. However, the industry in Romania is mainly composed of retail outlets selling standard units and offering no services. An opportunity exists for sophisticated firms to provide advanced services for the entire region, or to establish manufacturing facilities. Barriers to entry include lack of awareness and costs of installation or maintenance. However, EU backing is creating greater awareness of the issue.
- **Energy Efficient Motors and Variable Speed Drives:** It is estimated by the International Institute for Energy Conservation (IIEC) that 50% of industrial energy consumption [in Romania] is used by electric motors driving pumps, fans, and compressors. Due to the fact that many of the existing motors are either over-sized or over 15 years old and under-maintained, an opportunity exists for manufacturers, suppliers, and service-providers to market products and services for new construction, renovations, equipment replacement, and training for equipment maintenance and controls. Effective use of equipment and variable speed drives (to replace older equipment) has resulted in significant reductions in energy usage and cost savings for both governmental and industrial applications. Due to growing EU emphasis on energy efficiency, increasing

³ While the green building certifications currently refer to larger buildings, anecdotally and as evidenced by recent attendance at a green building conference in Bucharest in April 2008 (www.BuildGreenCEE.com), the authors have noticed a significant increase of interest in small scale solutions for individual homes.

⁴ The RoGBC is currently investigating the choice and/or development of a green building certification scheme. Its' mission is to provide support all green building implementations. More info: www.RoGBC.org

energy prices, and growing public awareness of the issues, demand for effective products and services is increasing, and funding is available to create cost-effective solutions and incentives. Further, the amount of aging equipment still in use, the increasing demand for energy efficiency, and the current construction boom, presents a unique opportunity for product and service providers in Romania. The US Dept. of Commerce indicates the largest opportunities for firms are in consulting, engineering, management software, control equipment and other specialized hardware.

- Tubular Day lighting Devices: An opportunity exists for the marketing and manufacture of tubular day lighting unitized systems in Romania, for single story and low-rise buildings to supplement the use of conventional fluorescent light fixtures. Whereas this technology is well-developed and documented in the US for many mid and low-rise commercial and residential applications (and represented by very few manufacturers), this technology is currently under-developed in Romania and the region. The dominance of mid and low-rise development throughout the region, and the dominance of traditional unitized fluorescent systems, and the criticality of energy efficiency across Europe, makes this energy efficient technology particularly relevant and under-utilized in Romania. Entry barriers include: lack of awareness, and lack of products in the market. EU funding is available to create incentives and offset costs.
- Insulation: Opportunities exist for the introduction of materials and competition into the insulation market in Romania, including: various forms of finished or unfinished foam insulation, aerated concrete, insulative concrete materials, insulated panelized wall and roof systems, and insulated wall systems to be applied over the existing typical concrete (or concrete frame) construction. Advanced products or systems are under-represented in Romania and the region, or insulative material markets are dominated by a few firms who have established local manufacturing facilities. Barriers to entry include additional construction costs over typical poorly-insulated construction methods, lack of awareness of the importance of insulation, "traditional" communist-period construction methods, and lack of experience regarding effective design of roof and wall systems for insulation and moisture. Additional opportunities exist for service providers regarding training and expertise regarding effective construction methods for insulation. EU funding is available to offset costs for additional costs for insulation or insulative systems for energy efficiency.
- Moisture: Due to the dominance of "traditional" communist-period construction practices, and lack of sophistication regarding the control of moisture, vapor retarders, and thermal separation, opportunities exist for sophisticated construction and design firms experienced with design and construction methods for climate sensitivity and the control of moisture. Control of moisture is a significant problem in ex-communist Europe due to the dominance of concrete structures with poor insulation and poor detailing for control of moisture and thermal separations. Consequently, many "period" buildings show significant signs of deterioration resulting from moisture. Furthermore, many structures currently under construction utilize many of the "traditional" construction practices, with little attention paid to control of moisture, effective insulation, and effective thermal separations. Whereas good practices can ensure long-lasting, efficient buildings; lack of such practices can cause buildings with short life spans and quickly deteriorated performance, causing further wastes in energy and materials. Opportunities exist for materials and service providers capable of providing expertise or systems for effective control of moisture. Barriers to entry include lack of awareness or importance of moisture control in buildings, and additional costs of materials or installations. However, funding is available for firms capable of demonstrating cost

savings effects or energy efficiencies resulting from effective construction practices.

- **Green Roofs:** An opportunity exists for provision of retrofit or new green roof technologies or systems for reduction of solar gain on new and existing roofs. Provision of green roof materials (high-reflectance roofing materials) or green roof systems (plant materials on roof) for shading can assist reduction in municipal runoff levels and improved air quality / natural filtration. Green roof systems are a very old and widespread technology in Europe, particularly Germany, and some sources indicate as much as 10% of roofs in Germany utilize a green roof planting system, with approximately 70% growth in the German market since 1994. However, this technology or market is under-developed in Central and Eastern Europe, and the proliferation of concrete construction in the Romania presents a potentially ideal substrate for this technology, as well as a potential for coordination with various horticultural or unique entrepreneurial opportunities. Due to the well-documented use of this technology in Germany, EU funding is possible to offset costs and provide incentives for developers.
- **Photovoltaics** – Europe is the fastest growing market in the PV industry. Currently approximately 48% of European photovoltaics are supplied from Japan. An opportunity exists to establish the manufacture and implementation of photovoltaics under license on a variety of scales in Romania, for use by individual or commercial/institutional consumers, to capture a portion of the European market. Barriers to entry in central and Eastern Europe have been training, awareness, costs, and investment; however costs and investment can be offset by EU funding sources to make this venture attractive. The aforementioned “Green Home” program of Romania’s Ministry of Environment and Sustainable Development has significantly increased the prospect of this sector, solar water heaters, and geothermal solutions.
- **Solar water heaters:** An opportunity exists for off-the-grid building and water heating: to reduce or eliminate load on LCP. Average EU growth rates in this market of approximately 13%, with significant adoption in Austria, Germany, and Greece, and mandatory use in Spain since 2005. However, despite significant market growth and widespread utilization in Europe, this opportunity is significantly under-developed in Romania, especially for medium or large or multi-unit installations by sophisticated firms.
- **Reduced solar gain on glass:** retrofit awnings and horizontal or vertical exterior shading devices for reduced solar gain on glass surfaces and improved energy efficiency in existing and new buildings – opportunity potential throughout the European market with little introduction in central and eastern Europe by advanced manufacturers with integration capability with smart-home technologies. Although reduction or prevention of solar gain on glass has been well-documented as a primary strategy for energy efficiency, few sophisticated exterior shading systems are currently available. Barriers to entry include lack of awareness, lack of products on the market, and costs of installation.
- **HVAC:** An opportunity exists for retrofit solutions for interior or exterior stack ventilation systems for existing buildings to improve natural ventilation, reduce building energy consumption, and reduce reliance on wall AC units. Due to the extent of existing mid-rise, poorly-cooled buildings throughout ex-communist Europe, market potential exists for a creative entrepreneur or manufacturer able to adapt existing technologies or strategies to this problem. Entry barriers include lack of awareness, costs of modification, lack of trained personnel, and the complexities of building ownership for residential apartment buildings (or “blocs”). However, EU funding is available to offset installation or modification costs to make this venture attractive. For new construction projects or a

major renovation of existing buildings, complete HVAC system that use the ground, water and/or air as a “heat sink” and/or the agent to insure a constant temperature for the living area while exchanging the air can present a welcome addition to the local market.⁵

Water efficiency and quality:

- Water efficiency is not just about selling toilets or pipe in the Romanian marketplace. The European Commission reports in the EU Water Initiative, that "In most developing countries, rural economic growth is critical for overall economic growth", and that in rural areas "the poorest and most vulnerable rural dwellers are particularly sensitive to lack of [clean drinking] water." The EU Water Initiative, in place since 2002, encourages all member governments to develop or improve system-wide management practices for water efficiency and water quality as a primary strategy for development and the fight against poverty and disease. Improvement to water management in Romania is critical to long-term growth and development overall. Opportunities exist for manufactures and service providers of all aspects of water management, distribution, treatment, and domestic fixtures to enter the market, promote awareness of the issues, and provide improved products and services and professionalization of the industry in Romania. Although typical low-flush or dual-flush toilets and some applications for "green" residential products may be on the market, and although some measures for water treatment have been implemented in Romania, significant coordination of water management and "green" strategies is lacking, and an opportunity exists for manufacturers and service-providers to take a critical leadership role in promoting (and developing) successful and coordinated water management practices in Romania, and throughout the region.
- Opportunities exist not only in urban areas, for district-wide improvements and services, but also in rural areas, to provide products and services for on-site management, treatment, distribution, or collection systems, as well as water-efficient fixtures. Products and services for specific technologies include: Low-flush toilets, waterless urinals and automatic fixtures, retrofit/replacement of existing fixtures, rainwater / gray-water collection and distribution systems for new and retrofit conditions, technologies for improvements to municipal water systems, and on-site filtration and treatment technologies or strategies. Barriers to entry include costs of retrofit or installation (compared to maintenance of current systems), awareness of the issues, and awareness of solutions. However, EU funding is available to offset costs for improved water efficiency or quality.

³ Also know as a “heat pump”, “geodesic system”, or “geothermic system”.

Waste Management / Recycling:

- Recycling is not just about used bottles and newspapers. The European Commission's Waste Framework Directive (codified and in force since 2006), states that "the essential objective of all provisions relating to waste management should be the protection of human health and the environment", and that poor waste management and disposal "may affect the quality of the environment and the smooth operation of the internal market." Recycling and effective waste management is necessary for long-term economic growth in Romania. Article 3 of the Directive mandates that all member governments take actions to prevent or reduce waste, and develop strategies of recycling, reuse, and reclamation. However, recycling and effective waste management is a significant and well-documented problem in Romania, and although there is awareness of the issues by the public and officials, a lack of coordinated waste management persists. In addition, green building certifications reward best practices in construction waste management. Consequently, an opportunity exists for manufacturers and service-providers to take a critical leadership role in promoting and developing successful and coordinated recycling and waste-management practices in Romania, and throughout the region. Barriers to entry include costs of installation or implementation of management practices, and lack of awareness of impact on environmental quality. However, funding is available to offset costs and to provide financial incentives.
- Opportunities exist for the introduction of recycling processes and strategies, equipment, recycled-content materials, and professionalized recycle/salvage services across all industries, including paper products, glass products, steel products, concrete products, rubber products, wood products, and plastic products.
- Additional opportunities exist for provision of engineered wood products and forestry practices for introduction of "alternative" light-gauge and energy efficient construction practices to the region.
- Additional opportunities exist for the provision of improved road-building technologies and engineered geotextile materials for improved road performance, retaining wall or landfill applications, and reduced maintenance costs.

Low-VOC materials:

- The European Chemical Policy (REACH), finalized in 2006, aims to protect human health and environmental quality while maintaining competitiveness and. As documented by many sources, prior to 1989, Romania was a leader in the chemical industry in central and Eastern Europe; however, due to lack of investment, many sub-sectors in the industry in Romania have vanished. A report by UN/ECE dated 2000 states "Potential partners [and opportunities] may be found among the chemical firms that already exist in many sub-sectors of the industry, including basic petrochemicals, pharmaceuticals, polymers and plastics, fibers, fine chemicals, paints and varnishes and a host of other products." An opportunity exists for manufacturers and services providers in the chemical industry to develop sustainable and low-VOC technologies for European or international markets. Entry barriers include costs of development and consequent higher product costs; however, EU funding is available to offset costs and provide incentives.
- Specific to construction, opportunities exist for entrepreneurs to develop various petrochemical, polymer, plastic, fiber, paint, varnish, sealant, and adhesive products for construction applications, including for compliance with current low-VOC standards.

- Both leading green building certifications reward the use of low (or no) VOC paint and other applications listed above.

Conclusion

As indicated above, there are numerous opportunities to enter the Romanian and surrounding market for green products, services, and technology. On the ground experience in construction and other industries has demonstrated that the local market – after reasonable awareness building efforts are made - readily adapts to superior solutions that can demonstrate return on investment. Significantly higher energy costs and mortgage financing has encouraged longer term planning in design and equipment with particular regard to energy efficiency.

About the research authors...

Romania Green Building Council

Romania Green Building Council (RoGBC) is a non-profit association encouraging the market, educational, and legislative conditions necessary to promote high performance construction that is both sustainable and profitable. The Council will also work towards the introduction and implementation of national green building standards and certifications to ensure market transformation and the rapid development of the green building segment. The RoGBC is an accredited “Emerging Council” of the World Green Building Council, has twenty three founding members or leading companies doing business in Romania and fifty member companies of committed to the greater environmental responsibility, energy efficiency, and sustained profitability inherent in green building principles.

For more information on the Romania Green Building Council’s activities, please contact Steven Borncamp or Anca Bieru at +40 21 222 5135 or via email at steven.borncamp@RoGBC.org or anca.bieru@RoGBC.org .

More information can also be obtained at www.RoGBC.org

SOPOLEC

SOPOLEC is a business and technology advisory services firm of with extensive international and local experience. The company assists business entities operating in or looking to enter the Romanian market by providing market entry research, access to a strong network, and strategic advice. The company is founded on the principle that strong ethics and responsible business behavior are vital components of sustained profitability.

The company is a founding member of the Romania Green Building Council. This research work was prepared prior to the formation of the RoGBC, updated with the input of its resources, and contributed to the body of research to be distributed by the Romania Green Building Council.

More information can be obtained at www.SOPOLEC.com

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