Green Homes & Mortgages

A TOOLKIT FOR RESIDENTIAL INVESTORS AND DEVELOPERS

GREEN HOMES

CERTIFIED BY

ROMANIA GREEN BUILDING COUNCIL

Paying Less for More!

- Superior Building Quality
- Reduced Mortgage Default Risk
- Lower Energy and Repair Costs for Homeowners
- Better Health for Families
- Greater Environmental Responsability for our Planet

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Executive summary

Supporting the creation of Green Homes through a credible, cost-effective certification program represents an opportunity for residential investors & developers to differentiate the quality and environmental performance of their construction projects while educating consumers about the financial and other benefits. Financial institutions – through the issuance of Green Mortgages tied to certified Green Homes – can significantly reduce their mortgage default risk and raise the asset valuation of homes they finance and can, therefore, offer a lower cost of financing. Lower finance costs provides the homebuyer with greater purchasing power to invest in improved construction quality as the Green Mortgage accurately values the significant reduction in energy, repair and health costs of those who purchase Green Homes. Green Mortgages will also help the Romanian marketplace better appreciate the positive value of sensible borrowing to invest properly at the beginning of the building process.

This initiative creates a consortium between a bank, the investor/developer, the home buyer and the Romania Green Building Council to certify green residential projects that are environmentally-responsible and energy efficient relative to the standard offer in Romania generating financial, social and environmental benefits. Increased energy savings and other financial benefits (such as improved occupant health and less frequent/lower home repair costs) substantially reduce the mortgage default risk allowing the lender to lower the monthly interest rate while maintaining profit margins. This enables the home buyer to invest into a more energy efficient and greener home while lowering their total monthly cost of ownership relative to a standard home.

The introduction of such a financial product is very timely in the context of the current and impending European Directives that require progress toward energy efficient buildings, reduced construction waste, and reduced toxicity of building materials compulsory for all new and existing residential buildings. Growing energy security concerns and rising energy costs reward residential projects that require less costly and natural scarce resources to build and operate. By contributing to the creation of certified Green Homes, residential investors and developers can greatly facilitate a rapid and profitable transformation of the construction and real estate industry toward a low carbon/green economy.

FIRST GREEN HOMES CERTIFIED BY RoGBC IN BUCHAREST: ALESONOR'S "AMBER GARDENS"

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Opportunities & challenges for Romania's homes

There is a direct correlation between the energy efficiency and green performance of a home and the level of quality in the design, construction and operation of that home. Fear of bank financing in Romania often leads homeowners to take suboptimal decisions who under-invest in the design and construction process (often choosing homes only on the lowest "Cost per Square Meter" value) and resulting in owning homes that are more costly to heat and cool, require more maintenance, more frequent renovations, and subject to reduced long-term asset values relative to Green Homes.

The most cost-effective moment to invest in energy efficiency and other green features of a home is at the earliest moments of its initial design and creation. This is particularly true regarding the "building envelope" or the roof, windows and walls which contribute substantially to energy efficiency performance but are costly and problematic to improve after the initial construction is complete.

In a 2013 study of 71,000 homes comparing default risks in Energy Efficient and Green Homes to standard homes a 32% reduction in mortgage default risk was found in the Green homes. The study also found that homes that exceeded the minimum standard to be considered "green" for the study exhibited an even higher reduction in default risk. The annual energy savings for green homes can be equal to one or two mortgage payments per year.[1]

Another comprehensive academic study found mortgage defaults were:

- 32% less likely if the apartment building is within a mile of protected open space
- 34% less likely if the building is in a neighborhood with at least 16 retail stores
- 58% less likely if in an area where at least 30 percent of workers commute to by subway/elevated train.[2]

A study of over 1.6 million homes in North America released in June 2014 concluded certified green homes have a 9% increased selling price relative to standard. The green homes in the study averaged 20 to 30% savings in energy and water use compared to code-built homes. A lower level of code and similar low energy prices indicate Romania can expect similar price premiums/asset values for certified green homes as the study identified.[3,4]

Romania is scheduled to liberalize its energy markets by the end of 2017 removing remaining energy subsidies for households; exposing the majority of homeowners (including many mortgage recipients) to 25% energy price increases. While this is, of course, subject to delayed implementation for political and social reasons, the liberalization will ultimately be started within the first years of a 20 year mortgage and will add continued energy pricing pressure throughout the term of the mortgage. The current economic challenges in Europe and much of the world notwithstanding, energy and natural resource usage and price are expected to increase dramatically due to global economic and population trends.

Some of the most prevalent reasons for early damage to a home affecting ongoing energy efficiency, visual appeal and asset value include insufficient and/or improperly installed thermal and hydro insulation. Green building solutions, by design and by definition, must be durable and therefore reduce the frequency and severity of repairs to a home.

Health issues of the borrower or a family member have material impacts on abilities to pay financial obligations. Holding healthier homes in mortgage portfolios will have a material, positive financial benefit from reductions:

- in accidents from better lighting and properly installed electric wiring;
- in exposure to volatile organic compounds (VOCs), formaldehyde, asbestos, lead, mold, and radon through choosing healthier building materials and utilizing proper insulation and renovation techniques;
- in exposure to carbon monoxide and tobacco smoke from better ventilation.

Sensible financing is the best choice to bring forward the available resources early into the construction process of homes allowing the homeowner to offset their early investment in quality and energy performance (via monthly mortgage payments) with the savings (via reduced monthly energy and repair bills). Each of the above points indicate banks underwriting mortgages in Romania can offer lower costs of financing without loss of profitability due to better repayment rates and higher long term values of the properties they finance. The points that follow offer additional benefits from supporting greener homes.

Buildings account for over 30% of total energy consumption and 40 to 50% of CO_2 emissions in Europe.

The current buildings regulations and achievement of an "A" on the Romanian Energy Performance Certificate require only a low level of energy efficiency which leads to high energy costs for the end-users during the period of ownership. Furthermore, the energy audit process is inconsistently applied and leaves little incentive for a developer/investor to aim for higher performance as they fear buyers will not be able to recognize the existence of superior building energy performance.

Key EU-driven legislation will, if implemented in a timely and robust manner, dramatically improve the quality, energy and green performance of Romania's homes beginning now and increasingly over the next 5 years. This includes:

— Nearly "Net Zero Energy Buildings" by 2020 requiring ultra low energy buildings with any energy use required offset by production of green energy;
— Dramatic reductions in Construction Waste diverted from landfills currently 25% to 70%;
— Significant restrictions on toxic chemicals allowed in building materials and requirements to disclose the chemicals used in materials production (e.g. REACH legislation).

Sensible financial mechanisms such as RoGBC's Green Mortgage program prepares the Romanian Construction and Real Estate industries for this impending legislation ensuring that green building pioneers have the financial tools to deliver homes to the market today or in the near future that include a strong business case for all stakeholders.

Romania has implemented the "Energy Performance for Buildings Directive" requiring Energy Performance Certificates for new buildings as of January 2007 with penalties for non-compliance added in 2012. The cost of the energy audit, therefore, no longer represents an optional or additional cost but a required cost of the real estate developer.

The Romania Green Building Council organizes the *Green Home Pavilion@TNI* in partnership with the National Real Estate Fair held twice yearly in Bucharest. The Green Home Pavilion showcases the country's exemplary green residential projects and the solutions that made them possible. RoGBC also delivers presentations about the financial, health and other benefits of Green Homes.

It is a chance to interact with both the home buying public and active real estate developers and investors. *Green Home Pavilion@TNI* has proven to be the most popular exhibit at the tradeshow and continues to add partner developers and solution providers demonstrating the growing interest in sustainable construction approaches in Romania.

Green Home Pavilion@TNI

Implications

Economic

The increasing energy costs and relative low energy efficiency in homes will constantly increase affecting households' available monthly cash and ability to pay debt obligations. At 13%, Romania has the 2nd highest impact on households of "Weights of household energy products in the Harmonized Index of Consumer Prices".[5]

Poor building quality increases maintenance/repair costs and reduces the future market value of homes in the event they must be repossessed by the bank; raising potential losses of mortgage portfolios and raising the cost of borrowing for potential homeowners.

Social

Loss of energy subsidies without adequate preparation will affect all households for all income levels. This does, however, disproportionately affect the low and middle-income class of the population as the energy bill is a higher percentage of their income and they generally live in lower quality (hence lower energy efficient... albeit smaller) houses.

Unstable energy security reduces policy options to confront aggressive petrol driven countries leading to increased or prolonged conflict.

Environmental

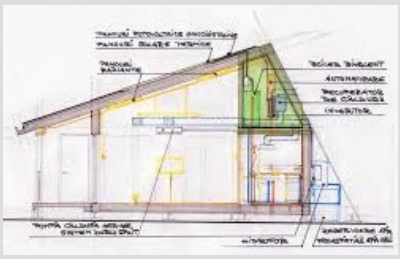
At the planned rate of construction, the negative impact of home construction is increasing significantly on the environment, the impact on the stock of conventional fossil fuels and a sustainable supply of natural resources.

Need for action

In consideration of the above facts and implications, it results that engaging the financial industry, residential investors/developers and those that provide the necessary solution to develop energy efficient and environmentally-responsible homes are a necessary and economically-preferable solution to reduce financial risk of mortgage portfolios and "future proof" Romania's homes for upcoming conditions in the near and long term. Banks' mortgage portfolios will perform better if homebuyers select sensible, cost-effective homes with the long-term financial outlook of the property considered at the time of taking the mortgage and purchasing the home. The role of investors/developers and green building solution providers in leading the way is of paramount importance.

Given the challenges with the security and projected long-term costs of conventional energy supplies, the superior maintenance cost profiles of green homes and a growing supply of conclusive evidence, 'business as usual' is the wrong choice for banks wishing to minimize risk in their mortgage loan portfolios.

Steven Borncamp
CEO, ROMANIA GREEN BUILDING COUNCIL



PRISPA and EFdeN are Romania's university teams that designed, transported, constructed and operated Net Zero Energy, green homes to compete in the prestigious "Solar Decathlon" bi-annual international competition held in Madrid (2012) and Paris (2014). Romania Green Building Council was an advisor and significant supporter of both teams. The PRISPA house was purchased by a private investor and installed after the competition in the Moldova region of Romania and Green Homes certified by RoGBC. The EFdeN home is currently being installed in Bucharest and pre-certified for the Green Homes program. More information at PRISPA.org and EFdeN.org.

photo top source: Tamoran posted @ Wikimedia

What is a Green Home?

There are many valid approaches to creating a Green Home but all are thoughtful in their design, construction and operation and minimize or eliminate the environmental impact of the creation and operation of the home. Here are some of the main components of Green Homes:

Energy Efficiency & Green Energy

Using "Bio-Climatic Design" principles (explained further below), a superior "Building Envelope" with significantly improved insulation and better doors and windows, and more efficient Heating, Ventilating, and Air Conditioning (HVAC) or natural ventilation and "Passive House" approaches; a Green Home minimizes energy use. Introduction of Green Energy – either on the home itself or through specifying contractually the delivery of Green Energy through Energy Suppliers ensures the reduction or elimination of fossil fuel derived energy.

Location

The construction of a green home does not utilize land with important contributions to bio diversity or a city's green space. The location reduces transportation impacts by having access to public transportation or rail or bus terminals and/or is in a "walk-able" community with the homeowner's needs for shopping, dining, schools, etc. nearby.

Sustainable & Healthy Materials

Green Homes utilize materials that are non-toxic to the home's occupants and safe in their production. Heavy construction materials are chosen that are manufactured close to the construction site to minimize transportation impact. Materials that contained recycled materials or, better, creatively "up-cycle" or "re-purpose" items that might otherwise end us as waste should be included. Durable materials mean less repair costs, less construction waste, and reduced environmental impact over time.

Indoor Air Quality

Technology solutions or natural ventilation (or both) are employed to ensure air is both healthy and pleasant. Paints, other coatings and adhesives are chosen that do not introduce toxins into the home.

Bio-Climatic Design: Lighting, Shading and More

Green Homes use "bio-climatic design" principles that include shading from the summer sun and collecting the winter sun with thoughtful orientation of the building and placement of the windows and skylights. Deciduous trees drop their leaves in winter to allow in sun and evergreen trees keep their leaves to protect against harsh winter winds and "solar gains" from summer sunshine. Indoor lighting is designed to ensure a safe, productive, and warm environment with a minimum amount of energy use. Designs that ensure natural daylight enters the building without solar gains in summer contribute to a Green Home.

Construction Site and ongoing Property Management

The construction process of a green home takes important steps to ensure the building does not damage or destroy the surrounding environment (reducing/eliminating erosion, protecting existing trees and bio-diversity on the site). In addition, residents receive information and have facilities (e.g. Composting area, Recycling Collection area, etc.) to operate their homes in an environmentally-responsible manner to ensure the home over time has a neutral to positive impact on the planet. Landscaping is created using creativity and indigenous plants to minimize "Urban Heat Islands", reduce the need for pesticides, fertilizers and irrigation systems.

Other Green Design Principles

Green Homes are designed to be durable to minimize repairs and heavy construction work if future needs changes. Smart design allows for different uses of the home as a family's needs change or new owners arrive with different needs. Green building principles demand better planning efforts and "Integrated Design" of the different disciplines to ensure optimal results, maximizes the use of space, avoid costly construction mistakes, and minimize waste in the building process.

RoGBC Green Homes Checklist

This checklist provides a full understanding of the criteria that need to be achieved to be certified as a RoGBC Green Homes approved project. The Checklists for both single family and multi unit homes are available in Appendix II of this toolkit.

With green products such as mineral wool insulation with bio-based, formaldehyde-free ECOSE™ technology and UrbanScape™ lightweight green roof solutions KNAUF Insulation became the first RoGBC Green Homes Approved Solution Provider. This solution contributes to the Energy Efficiency, Sustainable & Healthy Materials, and Indoor Air Quality criteria.

VELUX roof windows provide natural daylighting and natural ventilation and use sustainably harvested forest products.

E-MOTION ELECTRIC's car charging stations are manufactured in Romania and include fast charging options for a variety of plug-in-hybrid and full electric vehicles.

How does the Green Homes certified by RoGBC program work?

The advisory and certification process works to ensure, a real estate investor/developer successfully meets the program's criteria. The process includes a close collaboration between the Romania Green Building Council, the investor/developer seeking certification for their project, and the project team and solution providers who will undertake the necessary actions. The Steps include:

Planning a Green Residential Project – Preliminary Review

An Investor/Developer considering certifying their project can request a "Pre-Certification Review" with RoGBC to – in a no cost or low cost manner – quickly assess the feasibility of obtaining a Green Homes certification by RoGBC. The investor/developer meets with the RoGBC to discuss the project (site location, building approach, energy performance, pricing target, etc.) they intend to pursue. The process includes an estimated 2 hour meeting from which the RoGBC will produce an initial indication of the feasibility in a point-by-point comparison with the established criteria.

NOTE: It is strongly advised to begin this process as early as possible, even before a site has been selected. Projects that have already begun construction can be considered for the RoGBC Green Homes certification program, but they will be held to the same requirements as projects that pursued certification from inception.

Registration and signing the "Pre-Certification Agreement"

The Investor/Developer wishing to proceed with the Green Homes certification by RoGBC registers the project and pays the registration fee. The RoGBC, working with the project team and the information already collected at the Pre-Certification Review further defines the achievable criteria. The investor/developer and RoGBC agree upon which criteria will be achieved that provide the minimum score necessary and all mandatory requirements to satisfy the established criteria of a Green Homes certified project.

A "Pre-Certification agreement" is signed by the Investor/Developer indicating the actions to be taken and the method upon which they will be assessed. Upon the signing of this document, the developer/investor can begin to market their project as "Pre-Certified for Green Homes" informing potential buyers about the program and the green criteria they are pursuing. For those projects eligible for RoGBC's Green Mortgage program offered with a partner bank, this is also an indicator that this potential financial benefit can be mentioned (see "How does RoGBC's Green Mortgage program work?" section below)

Guidance toward a Green Homes certified residential project

The RoGBC and a qualified energy auditor meet and advise the project's design team throughout the design, construction, and commissioning process to guide the project to successful achievement of RoGBC Green Homes criteria. Using the criteria agreed to be pursued as listed in the Pre-Certification Agreement and encouraging "Integrated Design", the process is designed to ensure projects meet or exceed compliance with the program's requirements and produce no negative surprises at the conclusion of the project. Through the RoGBC's "Green Homes Approved Solution Provider" program, project teams can readily identify companies with the technology, materials, other products and services that will contribute to achieving the necessary green criteria for the project.

It is not mandatory to choose RoGBC Green Homes Approved Solution Provider as contributors to a project but the designation is intended to help project teams quickly identify qualified companies with proven results in delivering Green Homes meeting the certification required.

Designation of the residential project as a "Green Homes certified by RoGBC" approved project"

Upon project completion, RoGBC and a qualified energy auditor review the project as constructed to confirm the criteria as agreed in the Pre-Certification Agreement have been achieved. Should the project be sold without appliances, the project developer must inform the prospective buyer of the obligation to install energy efficient appliances for major equipment (e.g. Refrigerator, Microwave, Washing Machine, etc.). The RoGBC will check that the new owners are provided adequate information to operate their home in an energy efficient and green manner. The project team is provided the final scorecard and either a notification of successful certification of the project or indications of remaining corrective actions to be taken.

Offer a Green Mortgage to Home Buyers

Projects pursuing the Green Homes certified by RoGBC designation should discuss early in the process with participating to agree to underwrite Green Mortgages that receive discounted financing costs based on the green performance and reduced operating costs of the homes (see "What is a 'Green Mortgage'?" in the next section).

Monitoring of the Program

Recipients of Green Homes certification agree to share energy cost date of their homes and to operate the units as advised upon purchasing the home. The data will be useful to inform the various stakeholders of the environmental and financial outcomes of the program and contribute to future improvements.

What is a Green Mortgage?

A Green Mortgage is a unique home mortgage product offered by participating banks that reward the purchase of a Green Home certified by the Romania Green Building Council with a discounted interest rate due to the reduce mortgage risk default and higher home values associated with Green Homes versus standard homes.

Per the definition above, a Green Homes residential project certified by RoGBC will have significant reductions in the utilities and repair bills allowing households to save extra cash that can be applied to paying back their mortgage. This additional monthly income for the homeowner significantly reduces the risk of mortgage default from the owner of a Green Home compared to standard homes. In return, the bank reduces the monthly interest rate relative to similar products for standard homes due to the improved default risk and higher asset values of the Green Homes in the Green Mortgage portfolio of the bank.

While Green Homes require a new approach, they do not necessarily result in increased overall project costs. We can, however, consider an additional investment of 5 to 15% for construction costs as a potential premium for a home to reach the quality, operational cost reduction and environmental performance of a Green Home. The “total monthly cost of ownership” of the home is, however, reduced as the monthly energy savings and lower mortgage interest rate offset the slightly larger loan required for the purchase of a Green Mortgage qualified home. Much of any green construction cost premium contributes to the quality of the construction. This allows the investor/developer to recoup any additional investment to maintain profit margins without increasing the monthly ownership cost to the home buyer facilitating the transaction.

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GREEN MORTGAGE APPROVED PROJECT

The RoGBC Green Homes certification is the indicator to partner banks that the residential project has been assessed upon completion and satisfies the necessary criteria to receive the financial benefits of a Green Mortgage.

How does the RoGBC Green Mortgage program work?

The Green Mortgage is delivered through a consortium between a participating bank, a real estate investor/developer agreeing to meet the program's criteria, a home buyer seeking the benefits of the program, and the Romania Green Building Council (RoGBC) who guides the process and evaluates the project upon completion.

Identifying Partner Banks

The RoGBC and prospective Partner Banks agree to jointly administer and promote the Green Mortgage program. The program is made available to all qualified banks offering home mortgages in Romania who agree to the required criteria. The Partner Bank will continue to be responsible for all financial due diligence associated with its normal underwriting process. The Partner Bank will agree to accept RoGBC's criteria and RoGBC's process of certification of that criteria being met as valid to determine residential projects qualified to receive the beneficial terms of a Green Mortgage. The Partner Bank also agrees to offer a substantive interest rate reduction commensurate with default risk reduction and enhanced long term asset value of Green Mortgage-qualified homes. This discount must be significant relative to the normal market offer and not offset by additional fees and be upheld throughout the life of the mortgage.

Promoting Benefits for "Pre-Certified" Green Homes

The Investor/Developer agrees, at the beginning of the development process to create a residential development subject to the RoGBC's Green Homes Criteria and signs a "Pre-Certification Agreement" (see "How does the "Green Homes certified by RoGBC" program work?" section above). The investor/developer meets with the RoGBC and Partner Bank(s) to discuss including the project in their Green Mortgage program. Upon these partners' agreement and an accepted and signed "Pre-Certification agreement", the developer/investor can begin to market their project as "Pre-Certified for Green Homes" and informing potential buyers they will have a special discount on financing through the Green Mortgage program. It is the sole responsibility of the Investor/Developer to achieve all of the necessary criteria upon completion to enable issuance of the Green Mortgage product. All advertising of interest rates must conform to Romanian law.

Completion of Project, Certification and transacting Green Mortgage for Home Buyers

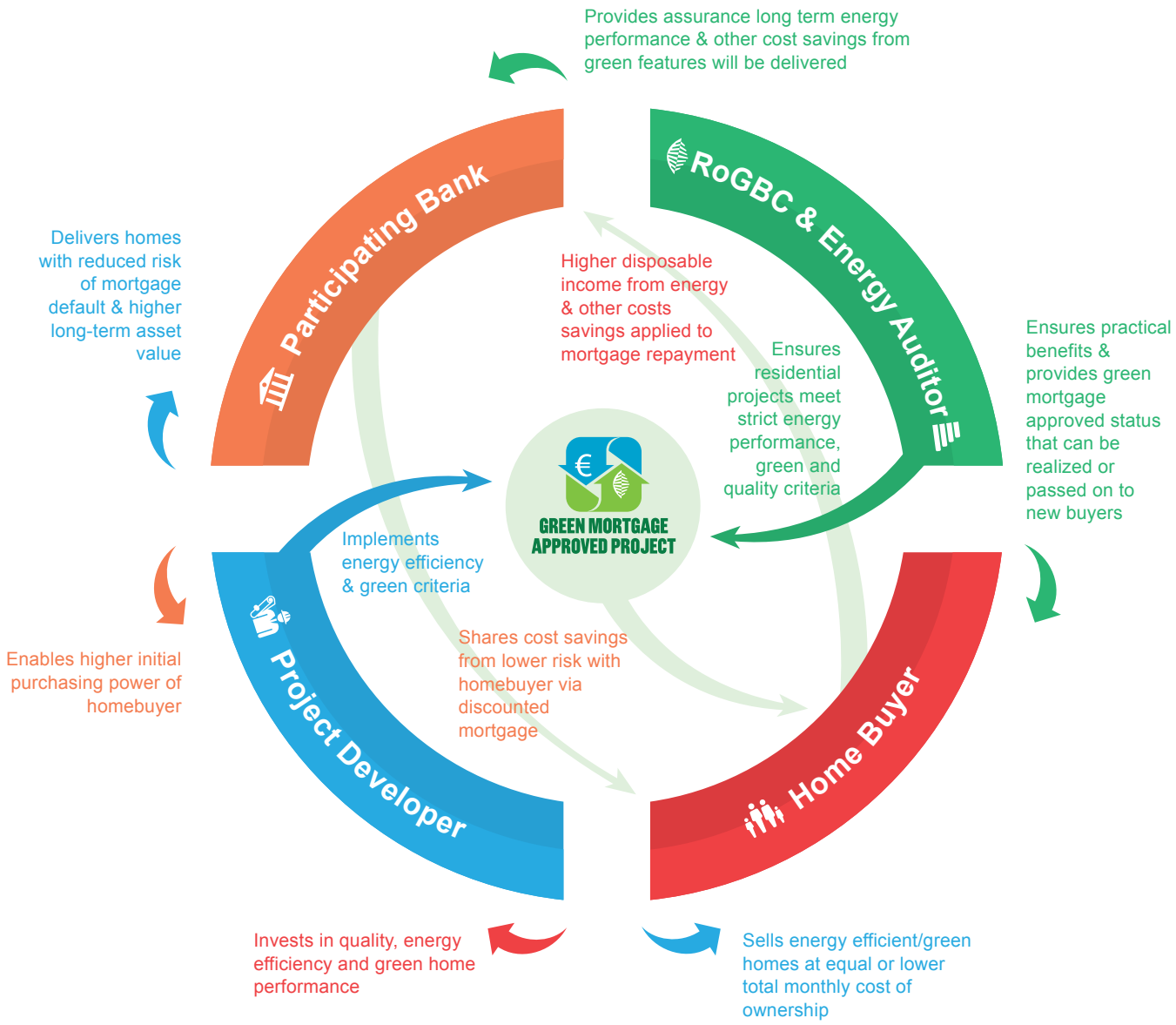
Upon analysis and successful achievement of a project as "Green Homes certified by RoGBC", the RoGBC notifies the partner bank(s) that the project is eligible to receive the discounted terms of the bank's Green Mortgage product. The underwriting process is similar to the partner bank(s)'s standard procedure from this point forward.

NOTE: while the Green Mortgage terms are made available only upon the Certification after the project has been completed, Investors/Developers must confirm with the participating banks at the inception of the project that the bank(s) are willing to issue mortgages for the project and would extend the benefits of a Green Mortgage should the project qualify.

Monitoring of the Program

Recipients of the benefits of the Green Mortgage program agree to share energy cost date of their homes and to operate the units as advised upon purchasing the home. This data will be shared with the participating banks to compare predicted versus actual performance. Additionally, the partner banks will share information on portfolio performance comparing their Green Mortgage to standard mortgage results.

Responsibilities & benefits from the program



Benefits to Stakeholders

General benefits of the project

— Elimination of the initial cost barrier for implementing energy efficient residential projects;
— Overcome other market failures that seriously inhibit the construction of greener, more energy efficient homes including:
— The "agency problem": the different interests of the developer and buyer are aligned though bank financing;
— The "information problem": lack of understanding of some home buyers of the reduction in the overall life-cycle costs due to energy efficiency measures is overcome by the energy audit, green criteria, coaching through the process and bank financing;
— The "rationality problem": people do not always act rationally in their economic interests when assessing short-term vs long-term benefits. Introducing a Green and Energy Efficiency component into financing brings a new incentive that transforms long-term benefits into short term (monthly) benefits.
— Demonstrates a concept that can be replicated and scaled upward.

Interior of Amber Gardens home by alesonor certified in November 2014

Green Homes certified by RoGBC require due consideration of indoor air quality, elimination of toxic building materials including paints, other coatings, adhesives and flooring, superior and efficient lighting quality, and other attributes that ensure a more healthy, enjoyable and valuable home.

The project will also bring important benefits to all stakeholders

For the investor/developer, this program provides

— Market differentiation as the "Green Homes certified by RoGBC" program is the only significant, project-level indicator of quality, long-term cost savings, and green performance on the Romanian market;
— Assurance of increased buying power of interested home-buyers;
— Increased demand for a unique market offering and competitive advantage (as the home-buyer will not feel the burden of the increased initial costs that are covered by the loan).

For the bank this program provides

— Introduction of a new financial product with predicable costs and revenues allowing differentiation in a highly competitive banking market;
— Reduction of risk of mortgage default in the bank's mortgage portfolio via the introduction of loans underwriting homes with lower energy and maintenance costs, and higher asset values;
— An effective program that aligns the banks' social and environmental responsibility objectives with the types of preferred projects they choose to finance;
— Demonstration of the bank's recognition of the higher value of an green buildings in terms of income security, quality, and market value;
— Contributes to significantly improving the environmental responsibility of the construction and real estate industry that also improves energy security and economic opportunities from a low carbon economy.

For the home-buyer the program provides

— Benefits from a higher-quality and energy efficient house with a net positive monthly financial benefit from energy savings and a discounted mortgage interest rate;
— The health attributes associated with Green Homes include reduced exposure to toxic materials (including carcinogens) and, for example, reduced incidence of asthma. Over the length of homeownership, this can provide significant financial benefit by lowering medical costs and reducing work days lost due to illness;
— A higher price in case of reselling the house due to a high "A" score on the Energy Performance Certificate, additional green criteria and the associated quality improvements.

What are the Costs of participating in RoGBC's Green Homes and Green Mortgage program?

The program is designed to expedite and encourage widespread adoption of greener industry practices. The program has a very modest price structure designed to provide the necessary resources to administer a high-quality coaching and certification process while not causing an undue burden on the partners participating in the program.

For Homebuyers

There is no cost to participate to the homebuyer. They are, in fact, reward substantially through a lower monthly cost of ownership and better quality, healthier home than the standard offer.

For Residential Investors/Developers

The following table includes the total fees to certify a residential project. The Pre-Certification fee, if any, is due prior to initiation of the review. The Registration fee includes creation of the Pre-Certification agreement signed between the Investor/Developer, the Partner Banks and RoGBC.

Multi-unit Apartments	**Non-members**	**RoGBC Members**
Pre-Certification Review	€75	FREE
Registration	€900	€675
Certification	€40/unit	€30/unit
Integrated environmental modelling including all technical analysis	€1,500/building	€1,000/building
The full project must be certified (i.e. not only those units that are transacted via a participating banks' Green Mortgage offer).		

Single Family Housing/ Detached Units	**Non-members**	**RoGBC Members**
Pre-Certification Review	€75	FREE
Registration	€700	€475
Certification	€375/home	€250/home
Integrated environmental modelling including all technical analysis	€1,300/home*	€750/home
* cost is per unique home plan that requires separate evaluation (i.e. this is only charged once on multi-unit projects replicating the same plan and construction approach)		

NOTES: Fee structure valid for Projects Registered by 27 February 2015 and the first building(s) commissioned by 20 December 2017. To ensure an accurate, mutual understanding, investors/developers are encouraged to discuss the project's fee structure at the Pre-Certification review. Reasonable Travel expenses, if necessary, must be reimbursed. The necessity of travel will be determined at the Precertification Review to ensure full understanding of the costs prior to initiating the full certification process.

Risks & mitigating factors

Lack of demand for housing, green or otherwise

This is related to the general state of the market and not the Green Mortgage program. A Green Homes certified project should, ceteris paribus, have a higher demand than regular buildings in every market situation; a fact demonstrated by strong sales of the first generation of green residential projects in Romania.

Overestimation of the energy efficiency savings by the certified auditors

The Green Homes certification process is carefully constructed to ensure planned objectives deliver expected results. The energy auditor and RoGBC assessor must be engaged at the earliest possible moment to instruct the design team on likely outcomes of their decisions. This risk is also mitigated by choosing energy auditors for the project who share the goals of estimating and realizing energy savings rather than "checking the box" of an administrative task. It is also recognized as core to the mission of the Romania Green Building Council to have credible and meaningful energy audits as a powerful tool to improve energy efficiency and green building performance in Romania and beyond.

Lower than expected performance of energy savings equipment and installations delivering less energy savings

The Green Homes certified by RoGBC program's requirements to achieve a top energy score provide strong assurance the building will perform to expectations. Critical components of green homes ranging from effective insulation and high efficiency Heating, Ventilating, and Air Conditioning (HVAC) equipment must function correctly to achieve the promised economic performance necessary to reduce mortgage default risk.

Solutions recommended for the program have been thoroughly researched, implemented elsewhere with clear results and, in the case of most systems, backed by manufacturers' guarantees.

Furthermore, close participation of the solution providers contributing to the pilot projects ensures that issues will be resolved quickly. Lastly, the Green Mortgage requirements to share ongoing energy performance on other operational data will provide continuous feedback to the construction industry improving the required skills to introduce best-in-class green solutions into Romania's homes.

Falling energy prices

Despite persistent macroeconomic challenges, energy prices and energy scarcity are predicted to go substantially higher. An increasing willingness of the EU and Romanian government to "price carbon" and tax inefficient behaviour greatly reduces the likelihood that the energy price to the end consumer will decrease. Dramatic technological advances in "green" energy might reduce long term prices but the wide-spread, positive economic benefits that would accompany this welcome scenario should clearly outweigh the smaller differential in expected financial savings from energy efficiency measures.

We have reached a critical point where the risk of "business as usual" with respect to financing new homes for the Romania market introduces significant future risk compared to instituting changes that improve the performance of the residential projects regarding energy use, resource use and construction quality. There is a significant opportunity to pre-empt the impending challenges by participating in a sensible and conservative approach to reducing risk in the housing market via greener construction approaches.

About the administrator of the program

Established in 2008, the Romania Green Building Council (RoGBC) is a non-profit, non-political association of the country's leading green building investors, solution providers and other important stakeholders endeavouring to deliver the market, educational, and legislative conditions necessary to promote high performance construction that is both environmentally-responsible and profitable. The RoGBC endeavours to create an exemplary development model for the region by ensuring the built environment will not imperil future generations but rather be a source of safety, health, comfort, innovation, and economic opportunity.

The organization promotes innovative financial tools for improving Romania's buildings including the "RoGBC Green Mortgage" program, advocates for local and national policy to provide property tax incentives for green buildings, organizes exemplary green building demonstration projects, provides the multi-disciplinary Green Building Professional education program, holds numerous awareness-building events on a variety of sustainable construction topics, and creates a marketplace for green building solutions and projects.

ROGBC awards 2014

Romania Green Building Council will host their 6th annual national green building awards. By selection of an expert jury, the annual event recognizes top achievement in the country by project teams, companies, government and educational institutions.

Authors and Researchers of the **Green Homes certified by RoGBC** and **Green Mortgage** program

STEVEN BORNCAMP
Founding president & CEO of the RoGBC

Mr. Borncamp initiated the Green Mortgage concept prior to the founding of RoGBC then contributed the rights to the organization on the condition it be made available on an "open-source" basis to assist financial institutions to introduce ambitious green building material into their decisions and pricing relating to mortgage financing. He is the lead author of the Green Homes certified by RoGBC and Green Mortgage toolkit and is supported by the Romania Green Building Council team and external experts engaged as contributors.

MONICA ARDELEANU Ph.D.
Director of development & policy for RoGBC

Dr. Ardeleanu provided research assistance and quality control for the RoGBC Green Mortgage toolkit set of documentation. She has worked with the building community to indentify partner companies for both the pilot stage and future expansion of the program.

ELENA RASTEI
Building sustainability expert, member of the board, RoGBC

Ms. Rastei developed the original set of criteria for the assessment of Green Mortgage aspiring housing projects. She chairs RoGBC's Certification & Education Task Groups and is responsible for the continuous evolution of the Green Mortgage program's criteria.

ALEX MOCANU & ANCA BOLOHAN
Project specialists at RoGBC

Mr. Mocanu and Ms. Bolohan provided research support forthe Green Mortgage program's criteria.

CRISTIANA CROITORU Ph.D.
Ph.D. in Civil Engineering, energy efficiency, indoor environmental quality and sustainable building design expert, and a researcher at the Technical University of Civil Engineering in Bucharest.

Dr. Croitoru contributed building performance knowledge related to the financial modeling of sample Green Homes projects and provided input into the criteria of the Green Homes aspiring housing projects.

Frequently asked questions

What are the first steps for a residential investor/developer interested in qualifying their project for RoGBC's Green Mortgage program?

It is important to contact the Romania Green Building Council at the earliest possible point of the development process. Given the importance of site location, it makes sense to understand what is a green approach to locating your project before purchasing land. The "Pre-Certification review" is free for RoGBC members or low cost (€75) for non-members. The review determines if it is feasible to expect certification by RoGBC as a Green Home subject to the planned approach of the investor/developer and what are the necessary steps to achieve certification.

Are the participating banks marketing the Green Mortgage program nationwide?

The only residential projects eligible to receive the benefit of RoGBC's Green Mortgage program are those which have been assessed and first "Pre-Certified" and later confirmed as "Green Mortgage approved projects". Therefore, Green Mortgage-eligible projects can be found throughout Romania but only those projects registered within the program offer the product. Each partner bank is free to choose how they market their participation in the RoGBC Green Mortgage program but the RoGBC recommends promotion occur at the level of each qualified project to avoid confusion in the first phase of the project.

What has prevented Green Mortgages from appearing until now?

Loans that reward investments in energy efficiency have existed for a number of years globally but most were focused on renovation and specific items (e.g. windows, HVAC, insulation) rather than a holistic approach necessary for a truly high performance, green home. In addition, cost effective and credible methods to assess the homes green performance did not exist in most markets; something the RoGBC certification now addresses. In recent years, financial institutions have begun to create and implement "Energy Efficient Mortgages" (or EEMs) with the most active programs being seen in the United States where the Environmental Protection Administration's "Energy Star" program for homes was used to qualify projects. Further progress has seen with government-sponsored entities such as the Federal National Mortgage Association (commonly known as "Fannie Mae") that purchase mortgages from lending banks encouraging incentives for these mortgage. Conclusive evidence strongly correlating energy efficient homes with substantially reduced mortgage default risk and higher home values over time indicates we will see far more weight given from financial institutions on the energy and green performance of the homes for which they underwrite mortgages.

How is the integrity of the Green Homes assessment process assured?

The mission of the RoGBC is to ensure the transformation of the construction and real estate industry toward greater environmental responsibility. To accomplish this, a credible and effective process to assess and reward only qualified projects for inclusion in incentive programs is of paramount importance. The Pre Certification Agreement established both the criteria and a clear indication of how successful achievement of the criteria must be achieved. Furthermore, performance details of all Green Homes residential projects certified by Romania Green Building Council must be entered into a public database of case studies at Construction21.eu ensuring transparency of claims made and results achieved. Representatives of partner banks offering Green Mortgages based on RoGBC's certification are invited to participate in the certification process to see firsthand how information is verified.

Some of the investors and solution providers of projects seeking certification are members of the RoGBC and therefore pay an annual membership fee to the organization. A potential for conflict of interest therefore exists. The RoGBC believes, however, this will not negatively influence the integrity of the certification process as:

1. the member companies, as a condition of eligibility for RoGBC membership, have pledges to contribute to environmentally responsible and ethical behaviour;
2. the membership fees of any one member represent a very small proportion of the annual RoGBC revenue;
3. the required transparency of the process makes non-performance easily observable by stakeholders (particularly partner banks and home buyers) who may be otherwise harmed by an ineffective certification process;
4. the establishment of a certifier's code of ethics further educates the stakeholders on the importance of maintaining and accurate and credible process.

Furthermore, with continued expansion of the program, the RoGBC will, with input and governance from partner banks, establish a separate legal organization with revenue derived only from certification activity to administer the Green Homes certification process. This step is estimated to occur in mid-2015 to allow RoGBC to focus on engaging investors, banks and solution providers at the current time.

Is the RoGBC Green Homes certification the only way to be eligible for a Green Mortgage?

The RoGBC believes their Green Homes certification program is the most cost effective and relevant method to assess green performance and resulting beneficial ongoing financial profile of homes in Romania. The RoGBC does not, however, want to create undue administrative burdens or costs on residential investors/developers who may wish to pursue another recognized green home certification. Therefore, with prior consultation with the RoGBC and partner banks of the RoGBC's Green Mortgage program, a project can be qualified for significantly reduced costs by recognizing other certification systems.

For example, a developer/investor chooses to pursue LEED for Homes certification of the project. RoGBC believes LEED "Gold" is a sufficient level of achievement to be qualified for a Green Mortgage. The Pre-Certification agreement between the investor, partner banks and RoGBC would specify the developer achieve LEED "Gold" certification, accomplish a reduced list of green criteria not covered by LEED, and agree to upload the project energy and green performance information into Construction21.eu. The RoGBC and the investor would also agree upon a significantly reduced fee – 10 to 20% of the standard certification fee plus travel costs if any, for example – to perform a one time, local assessment of the project to provide assurance to the participating banks of conformity to the RoGBC Green Mortgage program goals.

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Reference notes cited in this toolkit

[1] **University of North Carolina Center for Community Capital – Institute for Market Transformation.** *Home Energy Efficiency and Mortgage Risks.* **March 2013**

This study was conducted in the U.S. which has low energy costs similar to Romania and higher average energy efficiency in homes than Romania. The RoGBC Green Mortgage program criteria require a higher level of energy efficiency improvements relative to standard than the "Energy Star" homes used in this research. These facts indicate we could expect equal or greater relative reductions in energy costs from applying green home criteria and thus similar or greater relative reductions in mortgage default risk in Romania.

The Energy Star homes used in this research must achieve energy efficient performance greater than 15% of the International Energy Conservation Code although many achieve savings of 20 to 30%. Furthermore, the green building principles and approaches rewarded by Energy Star are included in RoGBC's Green Mortgage criteria; each having a strong, positive impact on building quality and reduced energy costs. The RoGBC program also includes a greater focus on avoiding toxicity in building materials choices which does not impact (or does so minimally) on costs for the whole project.

[2] **Journal of Sustainable Real Estate Volume 5, Number 1, Pivo, Gary.** *The Effect of Sustainability on Mortgage Default Prediction and Risk in Multifamily Rental Housing.* **San Diego, 2013**

[3] **Appraisal Institute.** *Appraisal Institute Supports USGBC's 'Green' Home Report Findings.* **Washington D.C., 2014**

[4] **U.S. Green Building Council.** *LEED® in Motion: Residential.* **Washington D.C., 2014**

While this study, focused on the California market between 2007 and 2012, may not seem immediately comparable to the Romanian residential market, the RoGBC believes useful comparisons can be made and similar outcomes can be expected. This is due to the fact that the average new built home in Romania underperforms an already strict building code in California and thus the quality difference – inherent in green construction – would be more evident in Romania relative to standard. In addition, both California and Romania have very low energy prices relative to the trend in Europe. That energy efficiency and water saving features are appreciated and priced into the sales price and a significant under these conditions is evidence that the business model will only strengthen as household subsidies are removed, European trends are localized, and fossil fuel energy supplies become more scarce and problematic.

[5] **European Commission.** *Energy prices and costs report working document, p.127.* **Brussels, 2014**

Weighted importance of household energy products on Romanian household budgets was extracted from statistics provided by Eurostat. "The Harmonised Index of Consumer Prices (HICP) is an indicator used for monetary policy decisions and is calculated in each Member State using a common methodology." "The assigned weight represents the importance of goods and services in a country's consumption structure."

Paying energy bills rank high on financial priorities of households as the energy companies have effective means of ensuring paying by stopping the supply of essential energy.

Additional references reviewed

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INTERNATIONAL ENERGY AGENCY, *Mobilising investment in energy efficiency: Economic Instruments for low-energy buildings.* **Paris, 2012**

MUNDO-HERNANDEZ, HERNANDEZ-ALVAREZ, SOSA-OLIVER, *Designing Sustainable and Healthy Homes*. **In:** *European Scientific Journal,* **vol.10, no.20. July 2014**

Appendix 1

Selection of pilot projects for RoGBC's Green Mortgage program

VISION by Studium Green
Cluj-Napoca, Romania

This completed project of 177 apartments delivers nearly 40% energy savings relative to standard, utilizes an existing building structure to minimize resource use and construction waste, is connected via public transit to the city center, and has easy, walk-able access to numerous facilities including shopping and schools. It was the first Green Homes approved project certified by the Romania Green Building Council.

AMBER GARDENS by Alesonor
Tunari, Romania

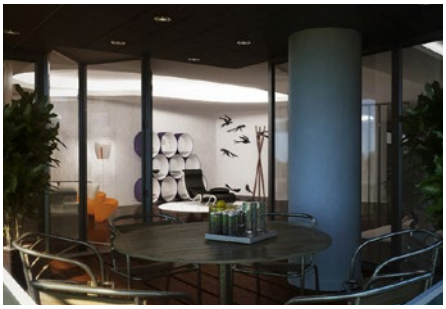
The model house of this luxury homes project is completed, six to follow shortly after, and a total of sixty single family houses planned. The houses are designed and constructed using bio-climatic design principles to achieve the ambitious Passiv Haus energy efficiency certification and, with photovoltaic panels installed, achieving in 2014 the nearly "Net Zero Energy" standard due by European Directive in 2020. Non-toxic coatings, adhesives, and other building materials ensure the future health of the families living at Amber Gardens. The homes' native plants and greener choices for roads and sidewalks add to the environmental performance of the homes. This project is the first Green Homes approved project certified by RoGBC for detached homes.

Lake District by American Eco Homes SRL
Iasi, Romania

This project in the Miroslava community near Iasi has begun construction with plans for over 600 row houses. The project uses innovative structurally insulated panels to achieve superior energy performance, seismic resistance and construction quality while maintaining affordability. The Lake District project's homes include passive solar design and optimize natural ventilation, Forest Stewardship Council (FSC)-certified wood, low VOC paints, adhesives, and flooring and water efficient sanitary items and landscaping. The project's construction management diverts over 50% of construction waste from landfills (with 25% being standard industry practice).

Valley 21 by Dalghias Development & Building the future
Vama Buzaului, Romania

This project includes 60 low impact, deep green homes that incorporate bioclimatic principles and green energy usage. The project has begun the construction of what will be the anchor of the community; a hospitality center. Construction of the full project will begin in Spring 2015. The project will merge modern and traditional building methods and incorporate local, sustainable materials.



Floreasca 1 by 1development
Bucharest, Romania

This project of 22 luxury apartments to be completed in February 2015 is in a premier residential section of Northern Bucharest, has good public transit access and is in a walkable district with shopping, schools, and other essential services nearby. The project provides superior energy efficiency and thermal comfort and incorporates sustainable landscaping and finishings including wood certified by the Forest Stewardship Council.

Casa Solaris – by Casa Solaris SRL
Voluntari, Romania

Is a single-family home located in the north of Bucharest that was completed in 2014 and is the first of a mini ensemble of 3 individual pilot homes. It is an active house – producing more energy than needed for its current operation – due to the contribution of its 72 sqm of photovoltaic panels with surplus solar electricity being fed into the public grid. Casa Solaris is also equipped with 37 sqm of thermal collectors used for both domestic hot water production and winter heating, using an innovative approach of underground storage of the summer heat surplus eliminating the need for a heat pump. Energy efficient construction and smart solutions for heating and cooling reduced the energy load to approximately 50 Kwh/ sqm/ year. The technology provides a healthy interior climate with controlled humidity and uniform temperature without undesirable air flows.

The EFden Home – by Team EFdeN
Bucharest, Romania

The EFdeN house was designed by Romania's university team as an entry to the prestigious "Solar Decathlon Europe 2014" contest. The home was assembled in Paris for the summer contest and is now being repositioned at the Technical University off Construction – Faculty of Installation Engineering in Bucharest. The EFDEN house successfully defines sustainability and integrated green and healthy materials. The central architectural prototype is a greenhouse providing a multi-functional integrated green space that delivers urban farming/food production, natural daylight, indoor air quality, and passive solar heating as well as a relaxing living space. The project is pursuing the ambitious "Living Building Challenge" green building certification as well as the Green Homes certification from the Romania Green Building Council.

There are an additional 22 large real estate investors developing residential projects conforming to the requirements of the RoGBC's Green Homes program. These investors along with relevant green building solution providers and representatives of financial institutions operating in Romania have attended a series of six comprehensive workshops to explain the details of the program.

Appendix 2

Assesment criteria of Green Mortgage approved projects
Multi Unit Scorecard

Requirements		Available points	Requirement notes
SUSTAINABLE SITE			
A1	Construction Footprint	1	Max 20% of the site
A2	Construction Waste Management Planning	Required	Reduce total construction waste or divert from landfills and incinerators a minimum 30% of the waste generated from new construction. Excavated soil and land-clearing debris do not qualify for this credit.
A3	Construction Waste Diversion		
	A3.1 50% C&D Waste – landfill Diversion	2	Reuse on site/Donate/Recycle by independent operator
A4	Recycled Content Base Material	2	Min 30% of total volume
A5	Heat Island Effect Reduction (Non-Roof)	1	SRI >78
A6	Stormwater Control:		
	A6.1 Permeable Paving Material	1	80% of the total hardscape area
	A6.2 Filtration and/or Bio-Retention Features	1	
A7	Heat Island Effect Reducton (Roof)	1	Steep slope: SRI 78 & Flat roof: SRI 29
A8	Resource Efficient Landscapes		
	A8.1 Low maintanance, adaptive plants	2	on > 25% of the total site area (excluding the building footprint) or 5% of the total site area (including the building footprint)
A9	Minimal Turf in Landscape		
	A9.1 No Turf and No Overhead Sprinklers Installed	2	100% turf free
A10	Trees to Moderate Building Temperature	1	
A11	Drip Irrigation System	2	
A12	Use of compost	2	
A13	Rainwater Harvesting System	3	2800 liters – 1 ; 9500 liters – 3
A14	Building Pulsed Submeter	2	Pulsed water meter
A15	Reduced Light Pollution	2	90 degree orientation light bulbs
A16	FSC Certified Wood		
	A16.1 Timber	2	80% FSC certified timber by volume
	A16.2 Panel Products	2	80% of total volume
A17	Integrated design	Required	Involve all team members in the following phases of the home design and construction process: conceptual or schematic design; preliminary design; energy and envelope systems analysis or design; design development; final design, working drawings or specifications and construction.
A18	Energy metering	Required	Install electricity and gas submeters for each residential unit.
MATERIALS			
B1	Natural materials (stone, brick, cob etc)	2	75% total volume
B2	Local Cladding Materials	1	100% of the materials
B3	Vegetated Roof	3	<25% – 0; 25-50% – 2; >50% – 4
B4	Insulation Content		
	B4.1 Walls and Floors	1	Min 10 cm thickness
	B4.2 Ceilings	1	Min 5 cm thickness
B5	Insulation – Low Emissions VOC		
	B5.1 Walls and Floors	1	below 10g/l VOC
	B5.2 Ceilings	1	below 10g/l VOC
	B5.3 Exterior	1	low VOC according to EU regulations
B6	Zero-VOC Interior Wall and Ceiling Paints	1	all paints
B7	Low-VOC Caulks and Adhesives	1	below 10g/l
B8	Environmentally Preferable Materials for Interior Finish		
	B8.1 Cabinets	1	water based/low VOC content
	B8.2 Interior Trim	1	water based/low VOC content
	B8.3 Shelving	1	water based/low VOC content
	B8.4 Doors	1	water based/low VOC content
	B8.5 Countertops	1	water based/low VOC content
B9	Zero Formaldehyde Emissions in Interior Finish		
	B9.1 Doors	3	Verify that regulated wood preservatives are absent and of the minimum content according to EN 717-1:2004
	B9.2 Cabinets and Countertops	3	
	B9.3 Interior Trim and Shelving	2	
B10	Low-Emitting Flooring	2	below 10g/l
B11	Operation waste management	Required	a) Include source separation of waste in each residential unit using 3 type of bags or small containers indicating: Blue for mixed recyclables; Green for organic waste; Black for residual waste; b) Composting area for yard clipping and all kitchen food waste. The owners/tenants shall be provided with a composting guide with provisions included in the Condo Association's requirements.

WATER EFFICIENCY

C1	Water metering	Required	Install a pulsed water meter for the entire building and/or submeter for each unit.
C2	Install Water-Efficient Fixtures		
	C2.1 Water efficient – low debit showerheads	2	< 9l/min
	C2.2 Bathroom Faucets	2	< 5l/min
	C2.3 Toilets – dual flush	2	3.0 to 4.5 l/flush
C3	Pre-Plumbing for Graywater System	5	
C4	Operational Graywater System	4	

IEQ & ENERGY EFFICIENCY

D1	No smoking in the common areas	Required	Prohibit smoking in all common areas of the building. The prohibition must be communicated in the sales contract, building rental or lease agreements or in condo or co-op association covenants and restrictions, and provisions for enforcement must be included.
D2	Condensation heating system – low dry nox emmitions	2	<50mg/kWh
D2.1	No refrigerant or ODP refrigerant <10	Y	
D2.2	Natural Ventilation	2	double opening window – two levels of user control
D2.3	Daylighting	2	average daylight factor >1.5
D3	Humidity Control Systems	1	
D4	High Efficiency Filters	1	F6 + Filter
D5	Pre-Plumbing for Solar Water Heating	3	
D6	Preparation for Future Photovoltaic Installation	1	
D7	Onsite Renewable Generation (Solar PV, Solar Thermal, and Wind)	20	10%-2; 25%-5; 50%-10; 100%-20

MANAGEMENT

E1	Third-Party Verification of Quality of Insulation Installation	1	Commissioning report
E2	Supply and Return Air Flow Testing	2	Commissioning report
E3	Mechanical Ventilation Testing and Low Leakage	1	Commissioning report
E4	EPC A+ ENERGY STAR® or equivalent Dishwasher, Clothes Washer, Refrigerator A	1	
E5	Lighting Efficiency		
	E5.1 Flourecent + electronic ballast	2	100% of total # of lamps
	E5.2 LED	2	50% of total # of lamps

COMMUNITY

F1	Smart Development		
	F1.1 Infill Site	1	
	F1.2 Brownfield Site	2	Decontamination procedure
	F1.3 Conserve Resources by Increasing Density	4	Build on vertical – P+2
F2	Development Located Within 500m of a Major Transit Stop	1	
F3	Pedestrian and Bicycle Access		
	F3.1 Connection to Pedestrian Pathways	3	
F4	Outdoor Gathering Places		
	F4.1 Public or Semi-Public Outdoor Gathering Places for Residents	1	
	F4.2 Pedestrian Access to Services Within 1KM of Community Services	1	
	F4.3 Public Outdoor Gathering Places with Direct Access to Community Services	1	
G1	Construction and/OR Demolition Waste Management Planning	Required	Waste management plan provided by RoGBC
G2	Transparency and Information Sharing	Required	Energy Data and Green Criteria to be uploaded as a case study in Construction21.org on the Romanian and English language platforms (estimated 2 hours of work)
G3	Orientation and Training to Occupants— Educational Walkthroughs	2	min 5 trainings via other approved providers
G4	Green Building Education for owner/tenant		
	G4.1 RoGBC Education Platform (minimum 3 courses)	2	min 3 courses via RoGBC
G5	Minimum energy performance (A grade EPC) + IES A+ report	Required	max energy consumption for heating: 50 kWh/sqm/year, for domestic hot water: 15 kWh/sqm/year, for air conditioning: 10 kWh/sqm/year, for appliances: 20 kWh/sqm/year and for lighting: 10 kWh/sqm/year or max 105 kWh/sqm/year energy consumption overall

TOTAL POSSIBLE POINTS	**130**
MINIMUM POINTS NECESSARY TO ACHIEVE GREEN HOMES CERTIFICATION	**80**

This is a scorecard used by the Romania Green Building Council to assess projects that are candidates for the Green Mortgage program. It is first used to generate a list of agreed actions to which the investor/developer commits. Upon a signed agreement between the RoGBC and the investor/developer, the project is allowed use of the “Green Mortgage Pre-Certified project” logo in marketing the project. This scorecard is used to guide the project to successful achievement of each of the Green Home criteria. The scorecard is also used in the final evaluation of the residential project and is the basis for which the RoGBC indicates to the partner banks that the project is eligible to offer the discounted interest rate associated with the Green Mortgage program.

Appendix 2

Assesment criteria of Green Mortgage approved projects
Single Family Scorecard

Requirements	Available points	Requirement notes
SUSTAINABLE SITE		
A1 Construction Footprint	1	Max 70% of the site
A2 Construction Waste Management Planning	Required	Reduce total construction waste or divert from landfills and incinerators a minimum 30% of the waste generated from new construction. Excavated soil and land-clearing debris do not qualify for this credit.
A3 Construction Waste Diversion		
A3.1 50% C&D Waste – landfill Diversion	2	Reuse on site/Donate/Recycle by independent operator
A4 Recycled Content Base Material	2	Min 30% of total volume
A5 Heat Island Effect Reduction (Non-Roof)	1	SRI >78
A6 Stormwater Control		
A6.1 Permeable Paving Material	1	80% of the total hardscape area
A6.2 Filtration and/or Bio-Retention Features	1	
A7 Heat Island Effect Reducton (Roof)	1	Steep slope: SRI 78 & Flat roof: SRI 29
A8 Resource Efficient Landscapes		
A8.1 Low maintanance, adaptive plants	2	on > 25% of the total site area (excluding the building footprint) or 5% of the total site area (including the building footprint)
A9 Minimal Turf in Landscape		
A9.1 No Turf and No Overhead Sprinklers Installed	2	100% turf free
A10 Trees to Moderate Building Temperature	1	
A11 Drip Irrigation System	2	
A12 Use of compost	2	
A13 Rainwater Harvesting System	3	2800 liters – 1 ; 9500 liters – 3
A14 Building Pulsed Submeter	2	Pulsed water meter
A15 Reduced Light Pollution	2	90 degree orientation light bulbs
A16 FSC Certified Wood		
A16.1 Timber	2	80% FSC certified timber by volume
A16.2 Panel Products	2	80% of total volume
A17 Integrated design	Required	Involve all team members in the following phases of the home design and construction process: conceptual or schematic design; preliminary design; energy and envelope systems analysis or design; design development; final design, working drawings or specifications and construction.
A18 Energy metering	Required	Install electricity and gas submeters
MATERIALS		
B1 Natural materials (stone, brick, cob etc)	2	75% total volume
B2 Local Cladding Materials	1	100% of the materials
B3 Vegetated Roof	3	<25% – 0; 25-50% – 2; >50% – 4
B4 Insulation Content		
B4.1 Walls and Floors	1	Min 10 cm thickness
B4.2 Ceilings	1	Min 5 cm thickness
B5 Insulation – Low Emissions VOC		
B5.1 Walls and Floors	1	below 10g/l VOC
B5.2 Ceilings	1	below 10g/l VOC
B5.3 Exterior	1	low VOC according to EU regulations
B6 Zero-VOC Interior Wall and Ceiling Paints	1	all paints
B7 Low-VOC Caulks and Adhesives	1	below 10g/l
B8 Environmentally Preferable Materials for Interior Finish		
B8.1 Cabinets	1	water based/low VOC content
B8.2 Interior Trim	1	water based/low VOC content
B8.3 Shelving	1	water based/low VOC content
B8.4 Doors	1	water based/low VOC content
B8.5 Countertops	1	water based/low VOC content
B9 Zero Formaldehyde Emissions in Interior Finish		
B9.1 Doors	3	Verify that regulated wood preservatives are absent and of the minimum content according to EN 717-1:2004
B9.2 Cabinets and Countertops	3	
B9.3 Interior Trim and Shelving	2	
B10 Low-Emitting Flooring	2	below 10g/l
B11 Operation waste management	Required	a) Include source separation of waste using 3 type of bags or small containers indicating: Blue for mixed recyclables; Green for organic waste; Black for residual waste; b) Composting area – for yard clipping and all kitchen food waste. The owner shall be provided with a composting guide with provisions.

WATER EFFICIENCY

C1	Water metering	Required	Install a pulsed water meter.
C2	Install Water-Efficient Fixtures		
	C2.1 Water efficient – low debit showerheads	2	< 9l/min
	C2.2 Bathroom Faucets	2	< 5l/min
	C2.3 Toilets – dual flush	2	3.0 to 4.5 l/flush
C3	Pre-Plumbing for Graywater System	5	
C4	Operational Graywater System	4	

IEQ & ENERGY EFFICIENCY

D1	Attached Garage Pollution Mitigation	P	Blow door test
D2	Condensation heating system – low dry nox emmitions	2	<50mg/kWh
	D2.1 No refrigerant or ODP refrigerant <10	1	
	D2.2 Natural Ventilation	1	double opening window – two levels of user control
	D2.3 Daylighting	2	average daylight factor >1.5
D3	Humidity Control Systems	1	
D4	High Efficiency Filters	1	F6+ Filter
D5	Pre-Plumbing for Solar Water Heating	3	
D6	Preparation for Future Photovoltaic Installation	1	
D7	Onsite Renewable Generation (Solar PV, Solar, Thermal and Wind)	20	10%-2; 25%-5; 50%-10; 100%-20

MANAGEMENT

E1	Third-Party Verification of Quality of Insulation Installation	1	Commissioning report
E2	Supply and Return Air Flow Testing	2	Commissioning report
E3	Mechanical Ventilation Testing and Low Leakage	1	Commissioning report
E4	EPC A+ ENERGY STAR® or equivalent Dishwasher, Clothes Washer, Refrigerator A	1	
E5	Lighting Efficiency		
	E5.1 Flourecent + electronic ballast	2	100% of total # of lamps
	E5.2 LED	2	50% of total # of lamps

COMMUNITY

F1	Smart Development		
	F1.1 Infill Site	1	
	F1.2 Brownfield Site	2	Decontamination procedure
F2	Development Located Within 500m of a Major Transit Stop	1	
F3	Pedestrian and Bicycle Access		
	F3.1 Connection to Pedestrian and Bicycle Pathways	3	
F4	Outdoor Gathering Places		
	F4.1 Public or Semi-Public Outdoor Gathering Places for Residents	1	
	F4.2 Pedestrian Access to Services Within 1KM of Community Services	1	
	F4.3 Public Outdoor Gathering Places with Direct Access to Community Services	1	
G1	Construction and/OR Demolition Waste Management Planning	Required	Waste management plan provided by RoGBC
G2	Transparency and Information Sharing	Required	Energy Data and Green Criteria to be uploaded as a case study in Construction21.org on the Romanian and English language platforms (estimated 2 hours of work)
G3	Orientation and Training to Occupants—Educational Walkthroughs	2	min 5 trainings via other approved providers
G4	Green Building Education for owner/tenant		
	G4.1 RoGBC Education Platform (minimum 3 courses)	2	min 3 courses via RoGBC
G5	Minimum energy performance (A grade EPC) + IES A+ report	Required	max energy consumption for heating: 50 kWh/sqm/year, for domestic hot water: 15 kWh/sqm/year, for air conditioning: 10 kWh/sqm/year, for appliances: 20 kWh/sqm/year and for lighting: 10 kWh/sqm/year or max 105 kWh/sqm/year energy consumption overall

TOTAL POSSIBLE POINTS	**130**
MINIMUM POINTS NECESSARY TO ACHIEVE GREEN HOMES CERTIFICATION	**80**

Appendix 3

Financial example for Green Mortgages

This case study compares an average "new build" project on the Romania market (represented by the "B" Energy Performance Certificate score) versus a "low A" and a Green Mortgage qualified project. The various components of the energy performance of the home are quantified. A "total monthly cost of ownership" is calculated to compare the financial impact of the owner of each residential units. This model makes conservative assumptions omitting, for example, the likely reduced repair costs of a green home versus a standard home.

	EPC "B" rated apartment	EPC "A" rated apartment	Green Mortgage qualified apartment
NET SAVINGS WITH GREEN MORTGAGES*			
Sale price of 70 sqm apartment	98,000	100,100	104,300
Loan amount	83,300	85,085	88,655
Monthly mortgage payment	580	593	578
Addition or reduction to monthly mortgage payment compared to "B" apartment	0	13	-3
Cost of energy/apartment/month (€)	101	65	33
Total cost of ownership	682	659	611
Net monthly savings: payment difference + energy savings compared to "B" apartment	0	23	71
Net annual savings for Green Mortgage Qualified versus "B" apartment	0	279	853

** Assumptions: Net size of apartment: 70 sqm; Market price: €1,400/sqm; Payment period: 20 years; Construction cost: €600/sqm. The developers will pass on the cost of the energy efficiency improvements directly to the consumers but will not add a profit on it.*

COSTS AND SAVINGS OF ENERGY EFFICIENT MEASURES			
Construction parameters			
Increase in construction cost from green measures (%)	0%	5%	15%
Construction cost (€/sqm)	600	630	690
Additional construction cost from green measures (€/sqm)	0	30	90
Total additional construction cost from green measures for home (€)	0	2,100	6,300
Energy consumption			
Energy consumption for heating (kWh/sqm/year)	117	70	50
Energy consumption for domestic hot water (kWh/sqm/year)	35	15	15
Energy consumption for air conditioning (Cooling) (kWh/sqm/year)	35	20	10
Energy consumption for ventilation (kWh/sqm/year)	10	5	5
Energy consumption for lighting (kWh/sqm/year)	49	40	10
Total energy consumption for apartment (kWh/sqm/year)	246	150	90
Cost of energy			
Average price of electricity (€/kWh incl. VAT)	0.12	0.12	0.12
Average price of gas (€/kWh incl. VAT)	0.04	0.04	0.04
Annual cost for heating energy (€/sqm/year)	4.89	2.93	2.09
Annual cost for domestic hot water (€/sqm/year)	1.46	0.63	0.63
Annual cost with air conditioning (cooling) (€/sqm/year)	4.11	2.35	1.17
Annual cost for ventilation (€/sqm/year)	1.17	0.59	0.59
Annual cost for lighting (€/sqm/year)	5.75	4.70	1.17
Total annual cost of energy (€/sqm/year)	17.40	11.19	5.65
Total annual cost of energy for 70 sqm apartment (€)	1,217.72	783.18	395.79
Average monthly cost of energy for 70 sqm apartment (€)	101.48	65.27	32.98
Energy cost reductions			
Average monthly energy savings relative to "B" apartment	0.00	36.21	68.49

MORTGAGE RATE CALCULATION			
Size of apartment (sqm)	70	70	70
Price of apartment	98,000	100,100	104,300
Percent of down payment	15%	15%	15%
Down payment	14,700	15,015	15,645
Interest (€)	5.5%	5.5%	4.7%
Repayment period (years)	20	20	20
Loan value	83,300	85,085	88,655
Yearly payment	6,965	7,120	6,934
Monthly payment	580	593	578

EPC (Energy Performance Certificate): displaying the results of an energy audit using the Romanian methodology in conformity with the European Union's Energy Performance for Buildings Directive.

Amber Gardens *by Alesonor*

GREEN HOMES

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ROMANIA GREEN BUILDING COUNCIL

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