This Presentation is structured into five main parts

Why Green Housing

- Why are greener buildings important?
- Mapping Macro drivers: Where is the biggest demand?

Opportunities & Barriers

- What are the sector level opportunities
- Why aren’t Green Buildings very prevalent?

Green Mortgages

- What is a green mortgage?
- The opportunity for mortgage lenders

IFC EDGE standard

- IFC’s green buildings certification system EDGE
- How can it make a difference?

IFC Experience

- IFC’s financial mechanisms for green buildings
- Examples of Green Buildings projects
Why are greener buildings important?

Low income families in Colombia pay close to 20% of their household income for energy and water.

Globally, 400 million homes are predicted to be built by 2020 most of them will be in emerging markets.

Green building regulations for Jakarta reduce energy use by 30% and increase construction costs by 3% saving.
Why “electricity”? The largest amount of energy used by buildings is in the form of electricity. Typically 20-40% of the electricity generated in a country is used by the buildings sector.

^ Russia and Ukraine have a net decreasing urban population
Residential Sector Opportunities

Domestic properties can be broadly split into single family dwellings and multiple occupancy, each have differing design issues. However when considering operations, thermal comfort, hot water and appliances are the main issues to tackle.

‘Embodied energy’ of materials used to building the homes can be significant over the lifecycle of the building.

**HIGH IMPACT INTERVENTIONS**

- Roof and wall insulation
- Low environmental impact building materials [embodied energy]
- Water efficient fittings and rain water collection
- Smart meters for better control and metering
- Solar hot water heaters
Why aren’t green housing developments more prevalent?

Knowledge and technologies needed to produce sustainable buildings are available. Economic benefits of sustainable design and construction are now well-documented.

Why are so few green homes being designed, built or retrofitted?

Why aren’t green property investment and developments mainstream?

‘Virtuous Circle of Blame’

Home Owners
“We would like to have an energy efficient home, but there aren’t any”

Builders
“We can build energy efficient homes but developers don’t ask for them”

Investors
“We would fund energy efficient buildings, but there is not demand for them”

Developers
We would ask for energy efficient developers, but investors won’t pay for them”

Adapted from Cadman, 2000
Opportunity to create a sustainable lifestyle. Success of a housing development is extremely sensitive to image, cost and location. Home buyers are beginning to perceive sustainable homes as good value by being more durable, economical and efficient to run, healthier and more comfortable.

### Key Drivers

<table>
<thead>
<tr>
<th>Home owners</th>
<th>Home builders/Developers</th>
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<tbody>
<tr>
<td>Cost saving from lower energy and water bills</td>
<td>Better corporate image and ‘Green’ branding</td>
</tr>
<tr>
<td>Better quality of life</td>
<td>Market place distinction</td>
</tr>
<tr>
<td>Better thermal comfort and self-sufficiency</td>
<td>Higher demand creating quicker sale and therefore better use of ‘capital’</td>
</tr>
<tr>
<td>Home owners pride in ‘doing their bit’ for the environment</td>
<td>Corporate responsibility towards the environment</td>
</tr>
<tr>
<td>Long term value retention</td>
<td>Long term value retention of properties</td>
</tr>
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### Specific Issues

- Difficulty for home buyers to assess efficiency of properties.
- Developers find it difficult to capitalize investments in green measures.
- Little control as to how the home will eventually be furnished or used.
- Long term management and transfer of responsibility of common services.
- Developer’s inability to transfer additional cost to total price of homes
Green Mortgages

What is a green mortgage?

A green mortgage is simply a type of mortgage that provides borrowers with 1) a bigger loan than normally permitted or 2) a money-saving discount as an acknowledgement for making energy-efficient improvements or for buying a home that meets particular energy-efficiency standards.

Green mortgages hinge on the principle that a more energy-efficient home means lower utility bills and, as a result, greater net income for the homebuyer, allowing the purchase of a more expensive house.

Example Calculation

<table>
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<tr>
<th>Energy saving</th>
<th>$15/month</th>
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<tbody>
<tr>
<td>Additional EMI</td>
<td>$4/month</td>
</tr>
<tr>
<td>Net saving during the loan period</td>
<td>$11/month</td>
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Assumptions:
- Package of measures: Solar DHW & Dual flush WCs, Additional capital cost $900, 15-year loan
Green Mortgages: Mexico Case Study

- The Infonavit’s *Green Mortgage Program* was initiated in 2007, to provide an extra credit to buy new houses which incorporate sustainable and energy efficient technologies, such as Solar hot-water, CFLs, water saving faucets, and thermal insulation.
- The Program targets state-aided house buyers with *low-income* for homes that cost less than $43,000.
- The Green Mortgage beneficiaries are able to obtain a higher loan depending on the increase in their ability to pay, derived from energy and water savings that generate the installation of eco-technologies in a dwelling. The additional credit amount can cover the cost of installing clean technologies.

**GREEN MORTGAGE MODEL**

![Diagram showing the process of getting a green mortgage](image)

**RESULTS**

* Infonavit is an autonomous, social service entity, with two social missions: to provide a mortgage loan to workers formally employed and registered at IMSS, focusing on low income workers, and to manage the pension fund formed with the employers’ contributions.*

In 2010, 100,025 green houses financed

In 2011, all Infonavit mortgages will be Green Mortgage

<table>
<thead>
<tr>
<th>Year</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010 ytd</th>
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<tr>
<td></td>
<td>647</td>
<td>1,131</td>
<td>105,104*</td>
<td>100,025*</td>
</tr>
</tbody>
</table>

Table 7: Green mortgages provided by INFONAVIT until September, 2010

*Source: CONAVI, 2010*
Green Mortgages

The Opportunity for Mortgage Lenders

• **Increase mortgage volume** due to having an enhanced suite of products, e.g. retrofits for existing mortgage clients

• Greater opportunities for **cross-selling**;

• Buildings with increased efficiency of resources such as energy, water and materials have documented higher value = **higher value collateral**;

• **Reduced risk:**
  - home buyers have lower monthly bills;
  - improved loan performance (since socially responsible homeowners tend to have better on-time payment records)
  - For retrofits, can target customers with good track record

• **Better image branding** as a provider of “green” products.
IFC’s green buildings certification system EDGE

- EDGE stands for “Excellence in Design for Greater Efficiencies.”
- EDGE is a green buildings certification system designed for emerging markets.
- EDGE reveals technical solutions for going green and captures capital costs and projected operational savings.
- EDGE is a simple, inexpensive, and reliable way to save on utility bills while reducing a project’s carbon footprint.

Who uses EDGE?

- **Investors** – to test the financial viability of a green building project.
- **Banks** – to offer green mortgages and green construction credit facility.
- **Developers** – to brand their projects ‘green’ and attract investors and buyers.
- **Building Owners** – to save on operational costs
How can EDGE Make an Impact in Emerging Markets?

‘High end’ rating systems [i.e., LEED, BREEAM] are focused on top-tier clients and provide solutions for a very small section of buildings that are being built.

EDGE has the potential to democratize the green buildings market – making it accessible to a majority of the building industry and addressing the core needs of developing countries.

The mass market needs a simple, quick, and affordable rating system for market transformation.

As most developing countries do not have effective regulations to control resource use in buildings, the need for a ‘voluntary’ system becomes even greater.
What is the EDGE Standard?

‘A greenfield building that has 20% less energy, water and material consumption compared to an equivalent local benchmark.’

The standard provides a performance assurance to buyers and investors.
The EDGE Tools

- EDGE has contextual data of utility costs and climate for different cities
- EDGE uses building physic calculations to give design-specific results
- EDGE spells out the most effective technical measures
- EDGE provides an investment planning tool for building owners and developers
The EDGE Tools: Data entry section

Project Details

- Project owner name
- Project name
- Unit name
- Project address

Type and Location Data

- Country: Brazil
- City: Porto alegre
- Income category: Low Income
- Air conditioning: No

Building Data

- Type of Home: Flats
- Floor Area/unit (m²): 50 m²
- No. of bedrooms/unit: 2 no.
- No. of floors: 5 no.
- No. of units: 20 no.
The EDGE Tools: Energy efficiency section

Energy Efficiency Measures
Select option from the list below:
- Reflective Paint/Tiles for Roof
- Reflective Paint for External Wall
- External Shading devices with HSA or VSA of 70 degrees.
- Insulation for Roof - Exposed to sun
- Insulation for External Wall - Exposed to sun
- Single Low-E, Solar Control glass
- Double Low-E, Solar Control glass
- Design Cross ventilation
- Install Ceiling Fans in all habitable rooms
- Install VRV/RRF for Space Heating & Cooling
- Solar collectors for domestic hot water heating
- High efficient Gas Condensing boiler for Space Heating
- Energy Efficient Gas Heaters for Hot water required for domestic use
- Low energy [CFL/LED/TE] Light Fixtures for all living spaces
- Low energy [CFL/LED/TE] Light Fixtures for Corridors & Outdoor Common area
- Automatic Controls for all Corridor & Outdoor lighting
- Photovoltaics to meet X% [choose from list below] of annual electricity use

10% of annual electricity: 0.00 kWp

Energy Saving: 44.9% Meets EDGE energy standard
**The EDGE Tools: Water efficiency section**

**Results**
- Final Energy Use: 257 kWh/Month
- Final Water Use: 21 m³/Month
- Embodied CO₂ Savings: 0.2 tCO₂/year
- Utility Costs Reduction: 13.1 $/month
- Base Case Utility Costs: 55.6 $/month

**Water Efficiency Measures**
- Low-Flow showerheads (≤7 litre per minute flow)
- Low-Flow taps for kitchen sinks (≤2 litre per minute flow)
- Low-Flow taps for washbasin (≤2 litre per minute flow)
- Dual Flush for Water Closets (WC’s) (≤6 litre per flush)
- Rainwater Harvesting System
- Use of Recycled Grey Water for Flushing & Landscaping
- Use of Recycled Grey Water Effluent Treated Water for Flushing

**Materials Efficiency Measures**
- Specify type of Floor Construction
- Specify type of Roof Construction
- Specify type of Building material for External Walls
- Specify type of Windows
- Specify type of Building material for Internal Walls
- Specify type of Flooring material for rooms
- Specify type of Insulation Material

**Embodied CO₂**
- In-Situ Reinforced Concrete Slab
- Common Bricks
- Aluminium
- Ceramic tiles
- Polystyrene

**WATER m³/Year**
- Base Case: 56 m³/year
- Improved Case: 56 m³/year

**Embodied CO₂ kgCO₂/m²**
- Base Case: 22 kgCO₂/m²
- Improved Case: 22 kgCO₂/m²

**Graphs**
- Graph showing water savings
- Graph showing embodied CO₂ savings
Instruments for Market Transformation in the Buildings Sector

EDGE provides a strong catalyst for the future of green buildings in emerging markets.

1. Regulation
2. Incentives (Fiscal or non-fiscal)
3. Benchmarking & Voluntary Labels
4. Financial Instruments (e.g. Green Mortgages)
5. Action for Utilities
6. Capacity Building

Building efficiency

Source: Institute of Building Efficiency
Multiple opportunities for IFC in Green Buildings

IFC present along value chain: market development; support for innovation (e.g. new age building materials); leverage client relationships and FI platform

Financing

- Debt, equity in buildings (eg.Vinte)
- Upstream inv. in material & technologies (eg.China Glass)
- Blended finance* (eg. Mexico)

Advisory

- Audits
- Technical assistance (Guides, design support, benchmarking)

Wholesale Approaches

- Banks (eg.Hungary RSF)
- ESCOs (eg.Optima)
- Leasing (eg.Water Capital)
- Property Funds (eg.Actis)
- Green Mortgages (eg.Kenya)

Country-wide

- Voluntary GB standards (eg. Lebanon, EDGE)
- Sector studies (e.g., Affordable Housing India)

Deal-by Deal

- Policy and regulatory support (eg. Indonesia & Colombia)

* terms softer than market through price tenor or security
Example of IFC’s Green Building Client: Vinte, Mexico

Business: Housing developer with affordable and sustainable home design as an integral part of its business model.

- VINTE’s attractive, well-planned developments are a major step up—and affordable through Mexico’s Green Mortgage program that provides incentives for purchasing energy-efficient homes. The program recently won the International Star of Energy Efficiency Award from the Alliance to Save Energy, a business-led global NGO.

IFC’s first direct investment in a sustainable housing developer

Key features
- Homes typically have solar hot-water, water efficient fittings, low energy light bulbs and smart meters.
- IFC’s first direct investment in a sustainable housing developer

Photo courtesy of Fernando N. Escárcega, Real del Sol-VINTE Project.
Example of IFC’s Green Building Client: Artha Capital, Mexico

Sustainable communities

Artha Capital provides investments in real estate developments for integrated and sustainable communities in Mexico.

IFC’s equity investment helped this property fund to acquire land and provide basic infrastructure for 60,000 homes with low-energy lighting and solar water heaters. By taking an approach that integrates industrial, retail, tourism, and residential, Artha Capital creates employment opportunities in communities with high environmental standards, enabling people to live near their place of work.

IFC Financing:
US$25 million equity

Significance: First example of a green building element in a property fund.

Key Features:
• 80% of developments to be within 200 meters of public transportation options.
• 50% of all street lighting to use solar-powered LED lighting.
• 60,000 homes to be constructed with low-energy lighting (CFLs) and solar water heaters.

Indonesia is one of the world’s largest greenhouse gas emitters with its building sector accounting for more than a quarter of total energy use in 2004 – a number that’s expected to rise to nearly 40% in the next two decades.

In response, IFC is helping the government of the capital province, Jakarta, develop a green buildings code. The code sets energy and water efficiency requirements for large commercial and high-rise residential buildings, and will require climate change adaptation practices to be included in building designs.

IFC’s main aim was to help create a code that is simple to implement, effective and easy to monitor. A key element of the analysis involved modelling a range of possible changes for each building type which met clear criteria for market preparedness and ease of implementation while maximizing the benefits of energy (CO₂) and water reductions in a cost-effective manner.

The details of the code have been developed in close consultation with government as well as private sector stakeholders including, developers, landlords and professional associations.

“…with effective implementation of the green buildings code in Jakarta, the city can serve as a model for implementation in other cities in Indonesia.” Fauzi Bowo, Governor Jakarta Province

* Note: GBC will mandate energy and water efficient requirements of buildings. It will also require buildings to include climate change adaptation practices in the design.
Implementation Matrix Summary

With an overall cost increase of 3% energy saving of more than 20% can be achieved across all new buildings in Jakarta.
IFC’s financial and advisory tools to deliver green buildings

**Objectives**

1. Demonstration effect and standard setting
2. Access to finance for Green buildings
3. Enabling achievement of International and National targets
4. Capacity building

**Client Relationships**

- **Owners**: Asset management, companies, owner occupiers
- **Builders**: Developers, home builders
- **Manufacturers**: Materials & equipment
- **ESCOs**: Energy Services, leasing & management companies
- **Banks**: Local financial institutions
- **Government**: National, Regional & Local
- **Associations**: Professional & Industry, including National GBCs

**Financial Tools**

- Equity/debt finance
- Equipment finance
- Bank guarantees
- Concessional finance
- Green Mortgages
- CP Lending Facility

**Advisory Tools**

- Capacity Building
- Regulatory support
- Sector Studies
- CP Audits
- Market Transformation

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Primary client
Secondary beneficiary
--- Indicates linkages
IFC’s strategy for Green Buildings

1. Actively seeking out green building projects which will also go on to create a ‘demonstration effect’

2. Supporting the development of Green Building Regulations in countries with strong political will

3. Creating GB facility by partnering with FM and local banks to wholesale GB investments. Concessional financing to incentivize EE investments.

4. Investing in ways to spread EE investments in existing buildings through Energy Service Companies (ESCOs).

5. Invest in green affordable housing in high urban growth countries like Brazil, Mexico and Colombia. This could be through direct long term financing models for developers as well as indirect mechanisms such as ‘green mortgages’ through local financial institutions.