Hello, I am Prashant Kapoor, head of IFC's Principal Green Buildings Specialist

Session Agenda

- Importance of sustainable urbanization
- Approach of the World Bank Group
- IFC's approach to green buildings
- Demo of EDGE Homes Beta Tool

Before jumping into the agenda, I would like to quickly review who IFC is and how it fits into the World Bank Group.

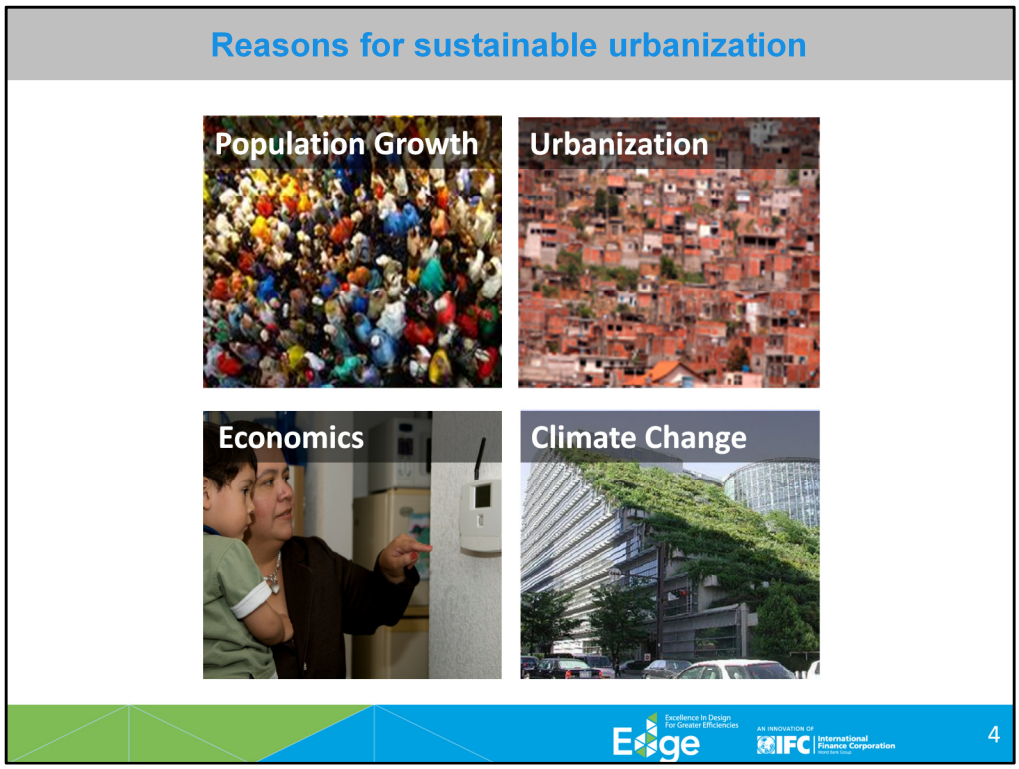
The Mission of the WBG is to reduce poverty and boost shared prosperity in developing countries.

To implement this mission, the World Bank group works through 5 institutions:
- The World Bank (IBRD and IDA) which lends money and provides advice to governments in middle income and low income countries, respectively,
- the IFC which provides financing and advise to the private sector,
- MIGA which provides political risk cover to private investors,
- and ICSID which arbitrates Investment Disputes.

IFC is the largest development bank focused solely on the private sector – and we are the main driver of private sector development in the World Bank
We now have about 3,800 staff –located in about 95 developing countries world wide.

We have 3 main approaches:
– our mainstay investment work – which is to provide market based funding to private companies doing business in emerging markets.
– our advisory services work - which aims to help overcome barriers for private sector growth
– and our asset management company which leverages our expertise with third party capital.

We invest in a variety of industries, including infrastructure and natural resources, financial intermediaries (banks, insurance companies), manufacturing, agribusiness, and service industries such as health, education, retail and tourism.



So why is sustainable urban development so important to the WBG?

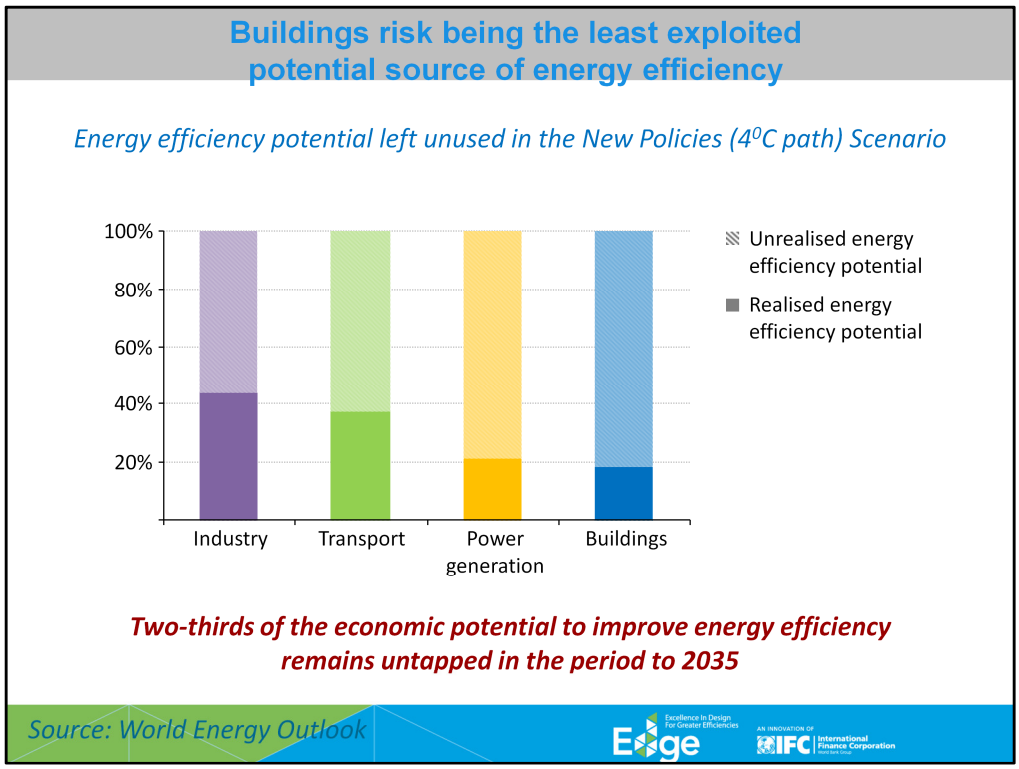
Climate change threatens to roll back years of development advances as agricultural yields fall, disease rises and extreme weather destroys homes and livelihoods. So addressing climate change is a priority for both IFC and the World Bank.

In the next few decades rapid urbanization will change the economies and lifestyles of people living in developing countries.

World **population** will reach 9 billion by 2050: 34% higher than today – growth will be fastest in poor countries, where population is expected to actually **double**.

50% of the world lives in cities today, and 70% will live in **urban** areas by 2050 – again, the biggest change coming in developing countries.

Population growth, combined with movement to the cities and rising incomes place cities at the heart of economic development, energy consumption and GHG emissions. Cities consume 66% of the world's energy today and account for 70% of current GHG emissions. The right urban policies can have huge economic and social impact as well as direct the trajectory for reducing GHG emissions in developing countries.



Buildings account for 15% of emissions today and emissions will double by 2030 under the IPCC high-growth scenario (the growth coming almost entirely from the developing world).

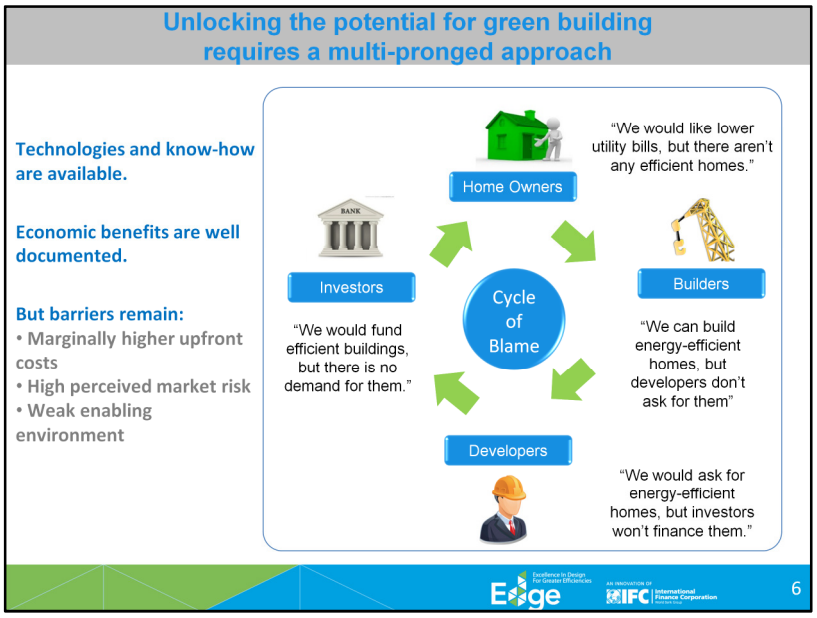
The urbanization trend we discussed create a huge demand for new build – and in particular housing. In fact, according to figures on new build from Pike Research/Navigant, housing will represent three quarters of all new build between now and 2020.

At the same time, with rising fuel prices, it makes economic sense to design this new build to save energy. For example, those living in low-income housing can often be paying 20% of their disposable income on utility bills.

BUT - according to the World Energy Outlook, even with current economic returns to improve efficiency in buildings, 80% of the economically viable energy savings in buildings is left untapped – more than in industry, transport, or power generation.

If the right investment choices are not made today, we will be locking into high-carbon urban infrastructure for the next 40 to 70 years.
Reducing urban GHG emissions requires innovation in urban planning and investment, service provision and regulations. The public sector will have to take a leading role – but private sector solution providers will also have to step up to the plate.

NEXT SLIDE: Why should so much economic value be left on the table when it comes to energy efficient buildings?



Why should so much economic value be left on the table when it comes to energy efficient buildings?

Technologies and know-how are not generally the problem. The economic benefits of building green are documented.

But the building sector is complex. There are many players and the divergence of interests and asymmetry of information and value creation between builders and buyers is key.

The main problems are

1) Perception of costs and affordability of green buildings are much higher than reality given falling technology costs. The World Green Building Council study showed that while the cost premium ranges from negative .5% to 12% higher, the perception is that it's from 1% all the way to 30% higher.

2) There <u>are</u> additional costs. Who pays? Developers don't want to absorb costs, while savings benefits go to owners.

3) For owners, especially in housing, immediate affordability often outweighs uncertain energy, water savings and long term appreciation.

4) Bankers don't want to provide additional financing to cover costs, because of the fear it will increase non-payment risk. They also don't want to establish systems to validate savings if there is not sufficient level of green building pipeline to finance.

5) Underlying this all is a lack of data on the financial benefits of green buildings – particularly in developing

markets. But some studies do exist for the developed world. For example, studies in the US and Europe show builders can command higher sales prices for green certified homes, ranging from 4 to 9% higher, with green homes selling as much as 4 times faster. Buyers save 15-20% on lower utility bills for green homes. The resale value is 4-10% higher. Banks enjoy a lower default rate from buyers of green homes – up to 33% lower.

Key is to addressing each parties concerns is to have a clear definition of a green building that
1) allows building designers to choose the lowest cost options to reach an agreed upon standard,
2) focuses on energy, water and materials savings for the end user that can be verified, and
3) that provides information and incentives to each party in the building eco-system.

So IFC has set itself the goal of moving the construction industry to a green path by reaching out simultaneously to all relevant parties through a multipronged program.

At the heart of the program is the EDGE green building design tool. EDGE stands for "excellence in design for greater efficiencies." I will tell you more about the EDGE tool and give you a demonstration, but the role of the tool in this program is to provide an easy to understand standard for green buildings that focuses on cost savings, and GHG reductions through less use of energy in the building and in its materials.

That standard is 20% reduction in energy, 20% reduction in water, and 20% reduction in energy imbedded in building materials. The tool helps developers choose the lowest cost options for their project to achieve these standards.

With a clear definition of a green building, and the savings it generates, the program addresses each of the major players in the system.

1) In government regulations, our aim is to raise the bar and get incentives right. We also want to reduce disincentives – in Egypt, we found that there was a tax on double-paned glass, treating a great energy efficiency improvement as a luxury item. We are now working with a variety of city and national governments on green building codes. The process is slow as there are often gaps in implementation capacity.

2) IFC is also launching a voluntary green building certification program. The program grew out of the ask by our clients who wanted to design and build green but needed a way to communicate and verify the benefits of efficiency to their investors and their end users. The emphasis of our program is on the mass market, with a low-cost, easy-to-use tool that reveals efficiencies at an early design stage and helps builders understand pay back periods for the cost premium. We have been using EDGE with our clients and certified 2 pilot projects – a housing development project by Mexican builder Vinte and 5 hotels in Mexico and Costa Rica by City Express hotel chain.

3) The certification system drives the creation of green building stock and let's developers get credit for building green. IFC is using our balance sheet to fund developers demonstration projects. To date, we have invested in over $500 million world wide.

People ask us why the standard for EDGE is only focused on 3 areas and reaches a reduction of 20%. In developing countries, we are seeing very low penetration rates for green buildings – for example, in India approximately 3% of new construction is registered for green certification. Meanwhile, India is expected to double its residential stock by 2030, while China alone is building the equivalent of square footage in Latin America in the next 10 years.

We have purposely focused on simple, low cost, achievable goals in order to get developing countries to take the first step on the green path. Size and scale matter. Transitioning a sizeable chunk of the upcoming building stock to be more energy efficient is needed if we are to bend the trajectory of GHG emissions in the next 10 years. The objective of this program is to achieve a 20% penetration in our target markets/sectors within 7 years of launching an EDGE program.

4) Finally, financing is key. IFC has relationships with almost 1,000 Banks around the World. Getting banks to understand and value the savings from building green is key to supporting the transition to this green path. The exciting thing about green buildings is that the investment and financing for the construction industry already exists. The challenge is to incorporate the additional upfront costs for resource efficiency into the financing which is paid for out of the increased savings, better credit ratings, and higher resale values of the green buildings. IFC is working with financial institutions to support new products such as green mortgages, and green construction finance. Banks are also worried about putting in the resources to develop new products, train staff, and convince their management to take perceived risks if there is no reliable flow of green buildings stock. That is why we must work on both sides simultaneously – building stock, while securing financing.

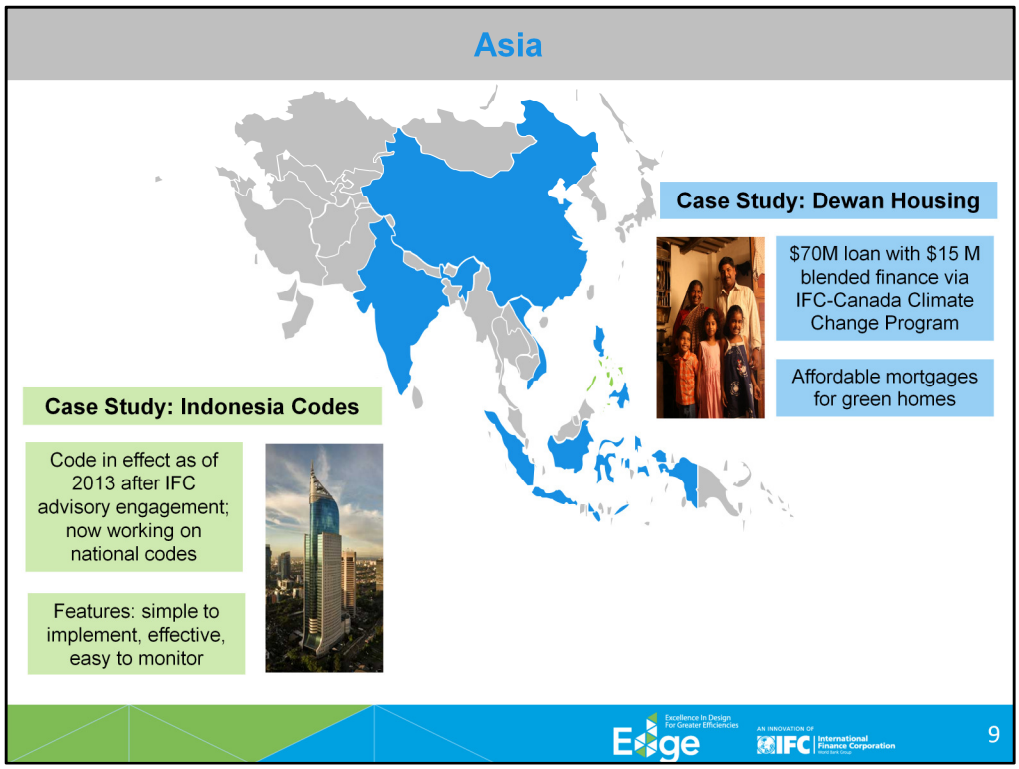
So - how far have we come with the program to date?

IFC has a very strong green building presence in Latin America.

Our first two pilot projects for EDGE certification were in this region.

We have done $172 M in investments – particularly in Mexico - including home developers, green hospitals, property funds, and energy services companies (ESCOs).

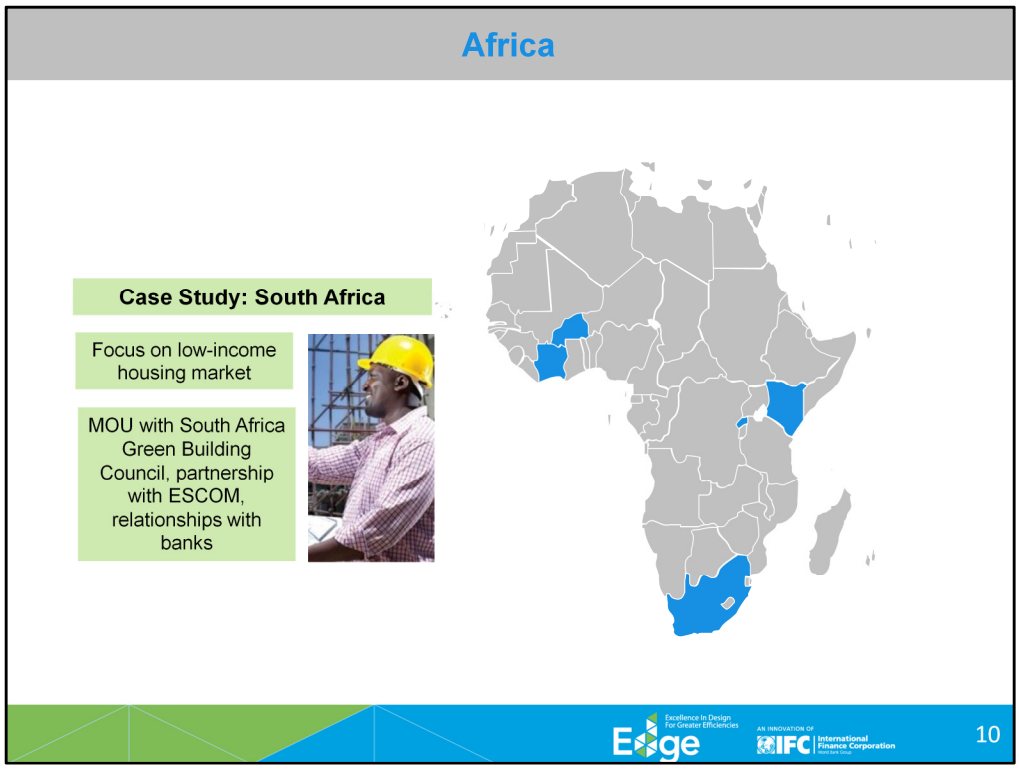
Our advisory work on green building codes is almost completed in Colombia, and is underway in Peru and Panama.



We are also focusing on Asia as one of the fastest growing regions, where GHG savings potential is tremendous.

We have a very strong engagement on building codes. IFC helped pass the code in Jakarta, which went into effect in January of 2013. Our guiding principle was to create a code that was simple to implement, effective, and easy to monitor. Indonesia is now rolling out the code on a national basis. We also have engagements in Philippines and Vietnam, and a memorandum of understanding with China's NDRC.

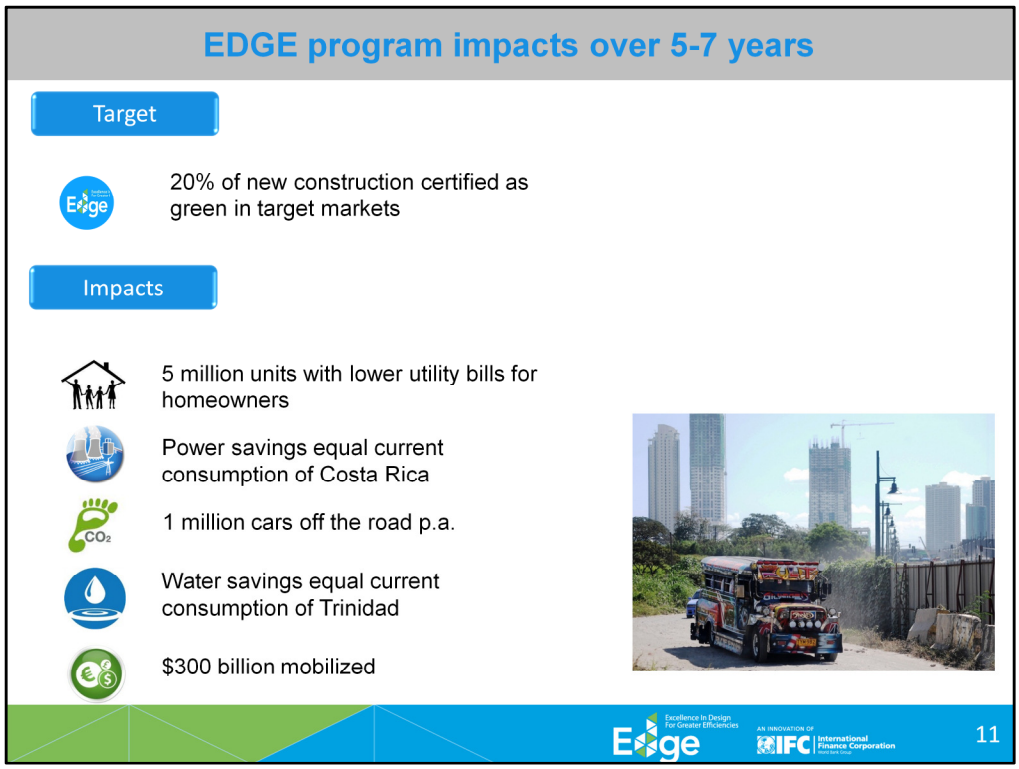
In South Asia, our focus is India, a country which is experiencing explosive growth in construction. Here, IFC's focus is on the municipal level, helping city governments roll out building codes. In addition to home developers, we have had successes with green hospitals, as well as with green mortgages, working through financial intermediaries like Dewan Housing bank.



While we have had some investments throughout Africa, our focus is on South Africa – another fast growing market.

Here, we are looking at the gap in affordable housing.

So far, we have an MOU with the South African Green Building council and have developed relationships with the local utility – ESCOM – as well as the local banks.



How ambitious are we?

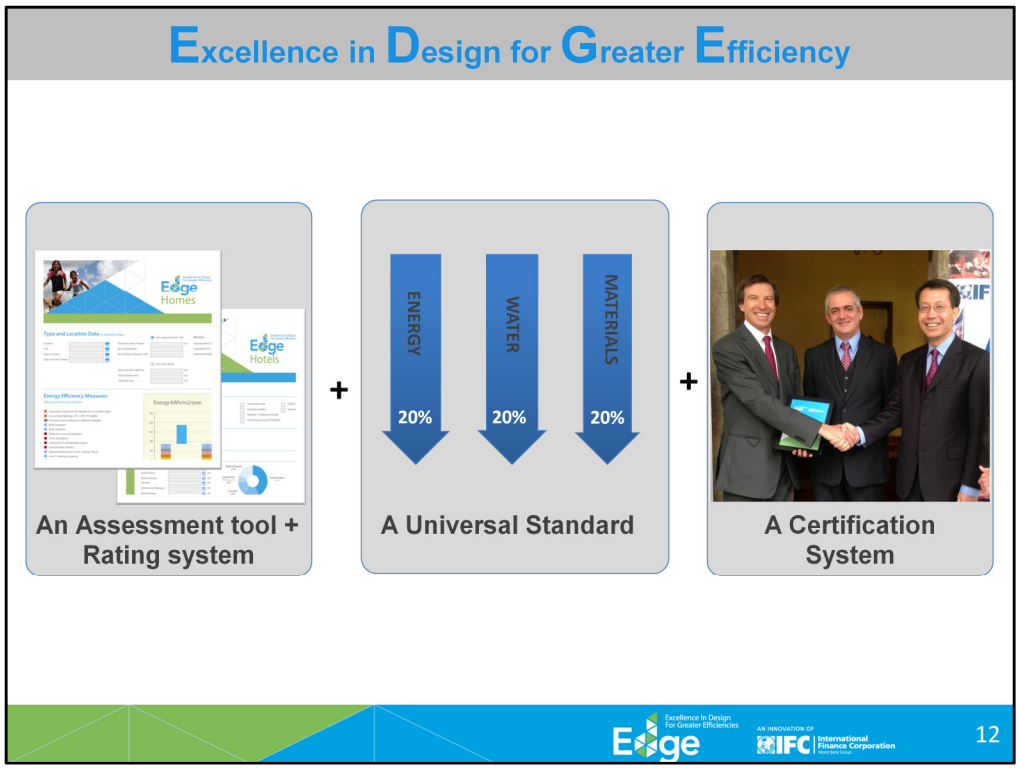
We are aiming at a certification penetration of 20% in targeted markets – hopefully a tipping point beyond which developers will frame the question "why would I not go green" rather than "what would going green mean?" – because we believe this would indicate a fundamental transformation in the way the building market works.

This equates to 5 million units with lower utility bills for homeowners.

By year seven the program will also save building owners about 5000 GWh electricity (equivalent to Costa Rica consumption) and 150 million M^3 water (equivalent to Trinidad and Tobago consumption) every year.

GHG reductions will be equivalent to one million cars off the road.

We are aiming to help catalyze up to $300 billion in private sector investment in green buildings over that period.



EDGE is a building design tool, a certification system, and a global green standard for nearly 100 emerging economies. The platform is intended for anyone who is interested in the design of a green building, whether an architect, engineer, developer, or building owner.

EDGE Tools

EDGE empowers the discovery of technical solutions at the early design stage to reduce operational expenses and environmental impact. Based on the user's information inputs and selection of green measures, EDGE reveals projected operational savings and reduced carbon emissions. This overall picture of performance helps to articulate a compelling business case for building green.

- EDGE has contextual data of utility costs and climate for different cities
- EDGE uses building physic calculations based broadly to give design-specific results
- EDGE uses a monthly quasi-steady-state calculation method based on the European CEN and ISO 13790 standards
- EDGE provides an investment planning tool for building owners and developers

The suite of EDGE tools includes homes, hospitals, offices, hotels, and retail supported by building-specific user guides.

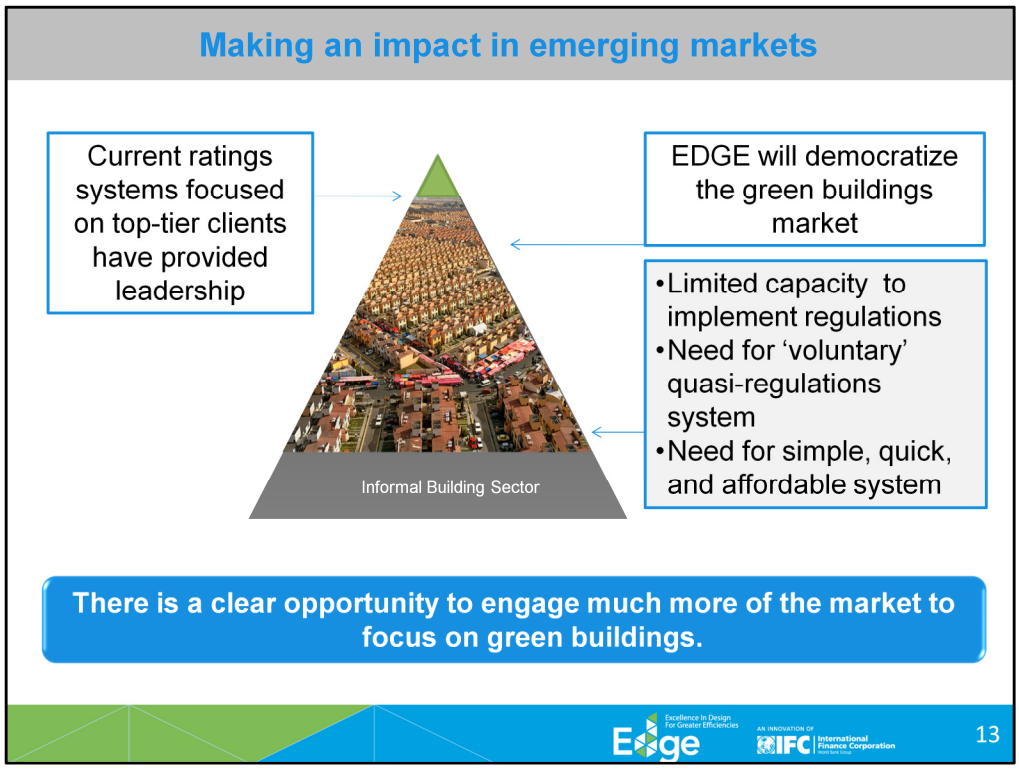
The EDGE Standard.

- To achieve the EDGE standard, a building must demonstrate a 20% reduction in operational energy consumption, water use, and embodied energy of materials as compared to typical local practices.

- EDGE defines a global standard while contextualizing the base case to the occupants and their location.

EDGE Certification

- Projects that meet the EDGE standard will receive a certificate confirming the project's predicted performance
- This can be used for corporate branding, marketing, and accessing better finance
- The Certification will be delivered through Certification Partners (IFC is currently identifying partners)

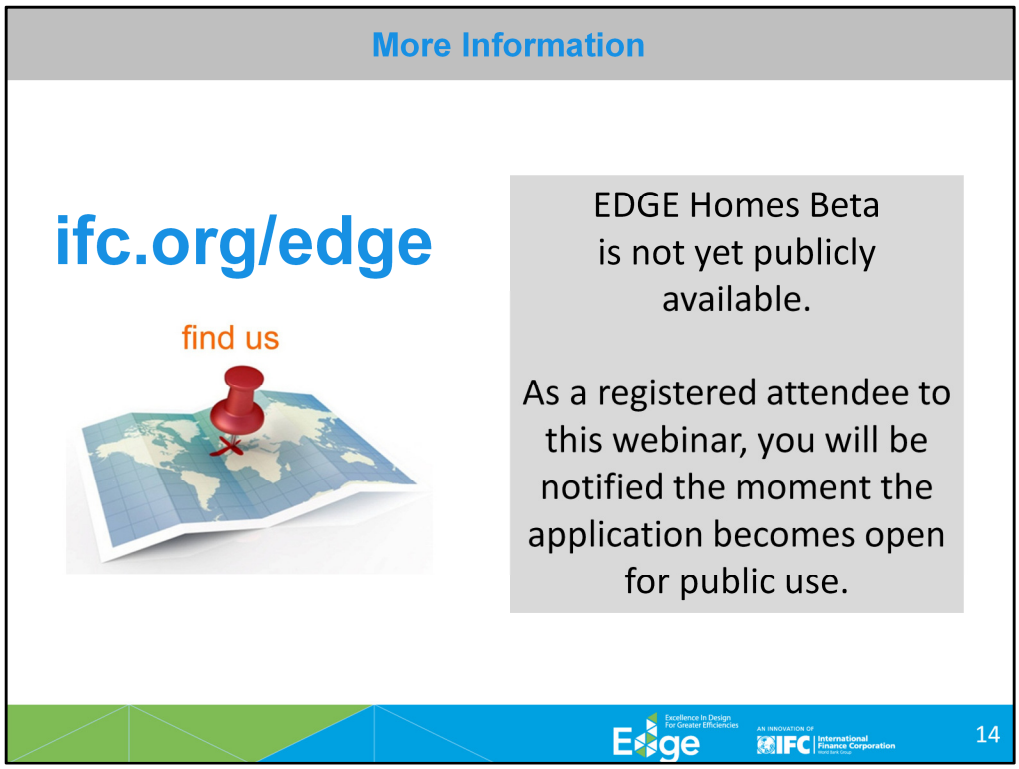


In developed countries, we have seen large scale adoption of GB certification such as, BREEAM in the UK and LEED in US. EPC and strong building regulations/policies have also push the building industry toward higher efficiency.

In the emerging economies, the GB certification systems have had mainly focused on top-tier clients.
these counties also limited capacity to implement mandatory regulations.
Given the fast pace of growth in the building sectors there is a danger that inefficiencies will get locked-in if large scale efficiency standards are not promoted.

Three main innovations are required to create a large-scale adoption of Green Building Standards in developing countries:
1.) Simplification of assessment criteria and therefore reducing the time and cost to meet the standard,
2.) Sharp focus on areas of resource use in buildings i.e., energy consumption, water consumption, and materials consumption, and
3.) Provision of an integrated tool which recommends cost-effective solutions to make the building design and specification 'green'.

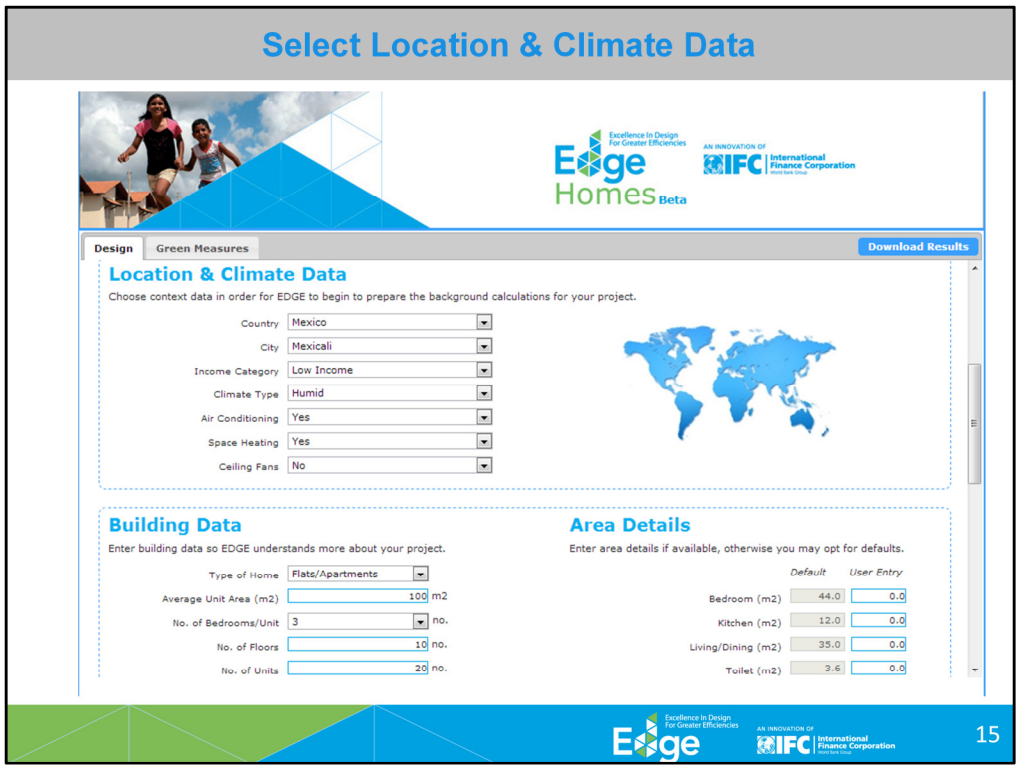
It is with this background that Excellence in Design for Greater Efficiencies (EDGE) was conceptualized and initiated.



We are very excited to demo the EDGE tool for you.

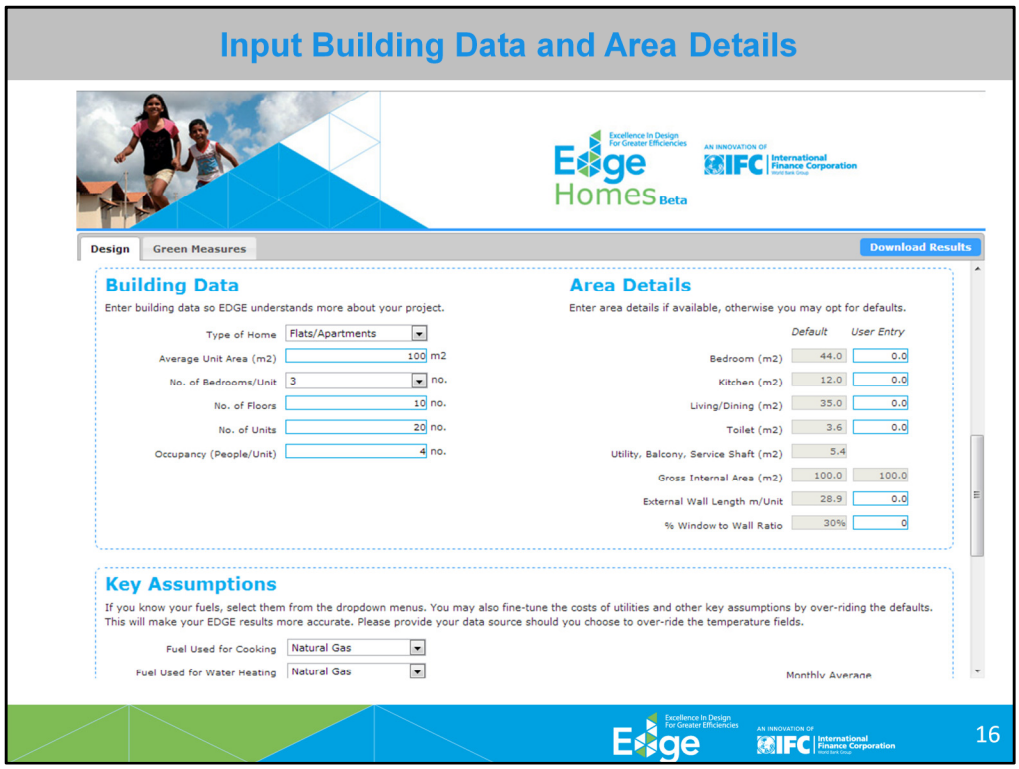
However, please know that the EDGE application is in beta testing and is NOT yet available publicly.

Since you have registered for this webinar, we will use your contact information and notify you the moment the application becomes open for public use.

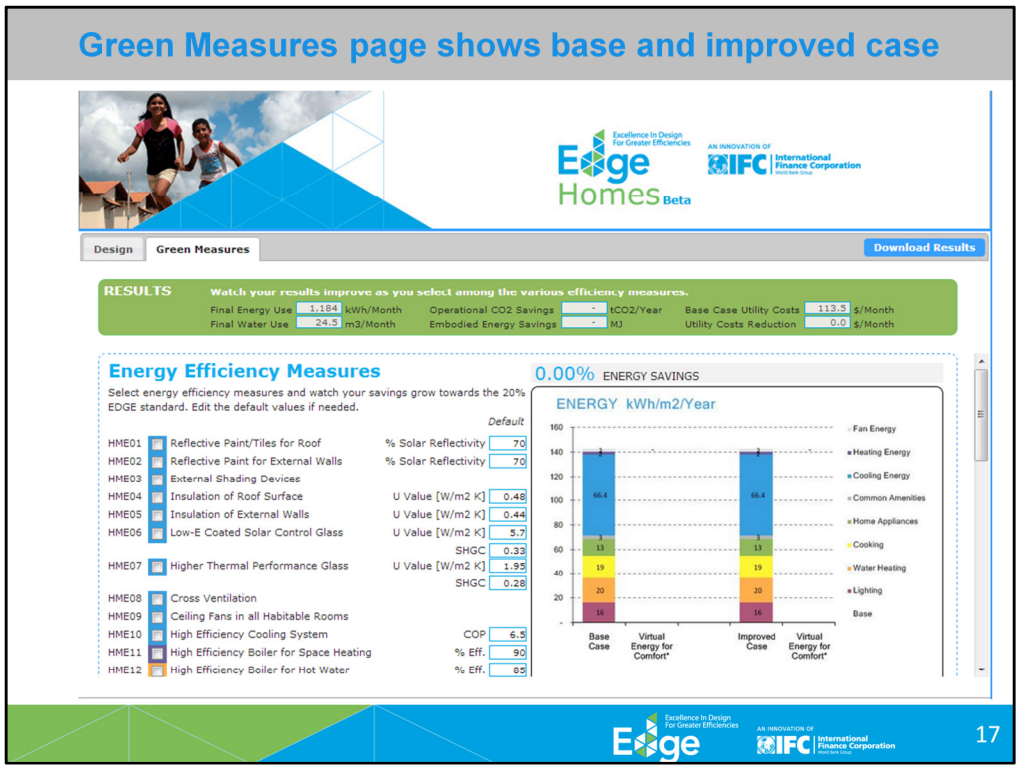


Choose Mexico- Mex. City
EDGE loads location-specific information within EDGE (currently data exists for nearly 250 large cities in developing countries):

Monthly average wet and dry bulb temperature
Monthly average outdoor wind velocity
Monthly average outdoor humidity
Solar radiation intensity
Annual average rainfall
Carbon dioxide intensity of the electricity grid
Average cost of energy (by fuel type) and water



Choose 55m2; 5 stories.
The area is automatically calculated;
which can be refined at the detailed design stage.



Creates Base Case energy/m2. where the energy will be used.
Choose Veracruz and show how the base case changes

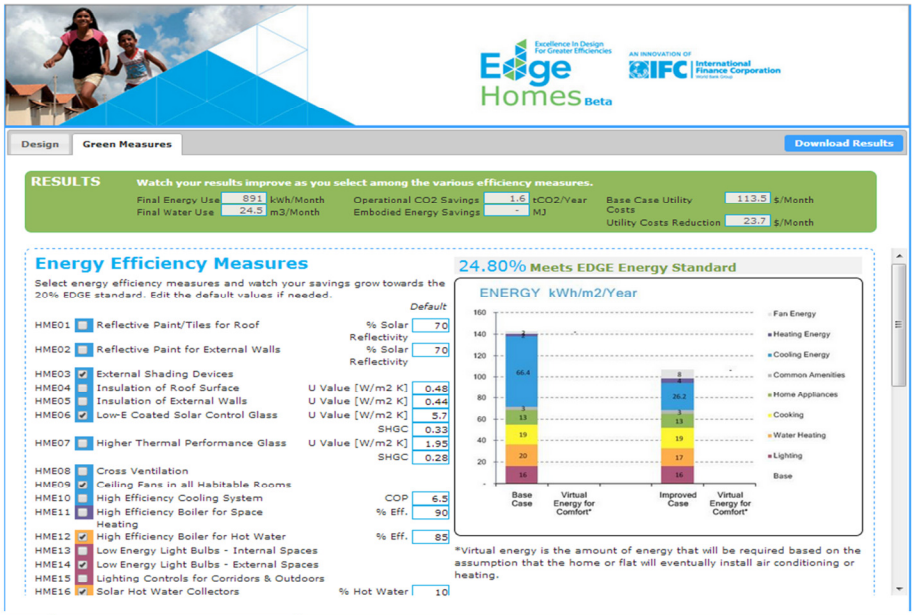
This benchmark in itself should be useful-as in most countries this does not exist.
Improved case is the same to begin with
Show “Results” per apartment

Measures –useful mouseovers

Click Shading, show %EE change
Choose insulation change U-Value
Choose lighting
Choose Solar DHW change % to 60%

Explain ‘Virtual Energy for Comfort’ by changing A/C to “No”

Improved case results change when measures are ticked



Water Efficiency Measures are connected to Energy Efficiency

Excellence In Design For Greater Efficiencies
Edge Homes Beta
AN INNOVATION OF IFC International Finance Corporation

Design | Green Measures | Download Results

RESULTS Watch your results improve as you select among the various efficiency measures.

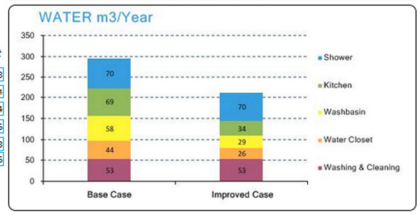
Final Energy Use	889 kWh/Month	Operational CO2 Savings	1.6 tCO2/Year	Base Case Utility Costs	113.5 $/Month
Final Water Use	17.7 m3/Month	Embodied Energy Savings	- MJ	Utility Costs Reduction	27.2 $/Month

Water Efficiency Measures

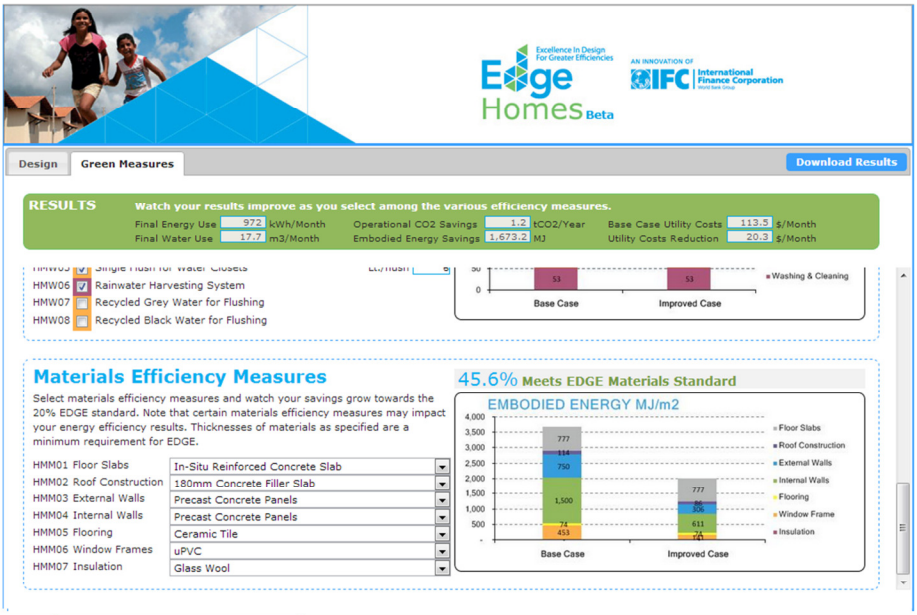
Select water efficiency measures and watch your savings grow towards the 20% EDGE standard. Edit the default values if needed. Note that certain water efficiency measures may impact your energy efficiency results.

		Default	
HMW01	Low-Flow Showerheads	Lt./min	8
HMW02	Low-Flow Taps for Kitchen Sinks	Lt./min	4
HMW03	Low-Flow Taps for Washbasins	Lt./min	4
HMW04	Dual Flush for Water Closets	1st - Lt./flush	6
		2nd - Lt./flush	3
HMW05	Single Flush for Water Closets	Lt./flush	6
HMW06	Rainwater Harvesting System		
HMW07	Recycled Grey Water for Flushing		
HMW08	Recycled Black Water for Flushing		

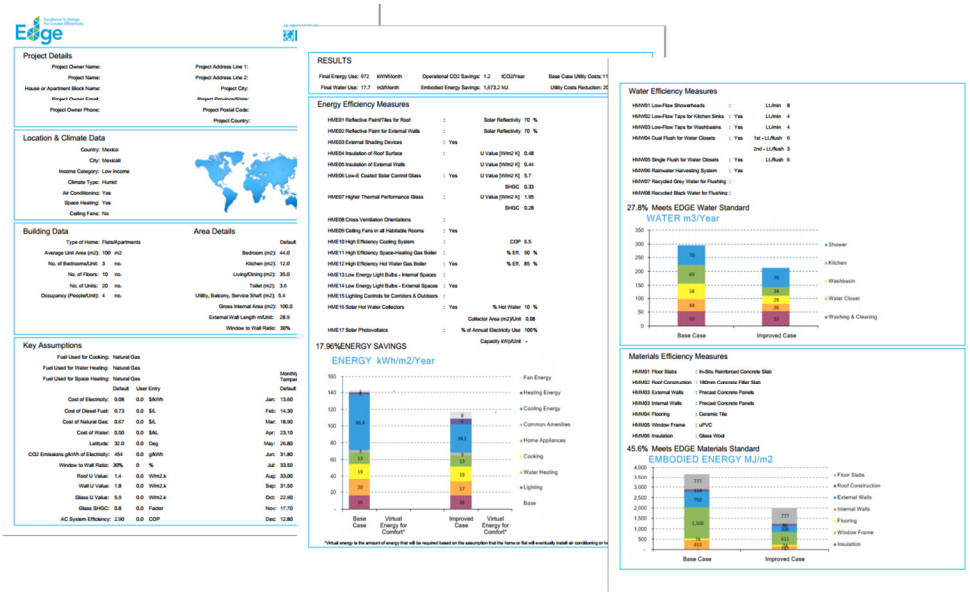
27.8% Meets EDGE Water Standard



Materials section measures embodied energy of materials



Downloadable pdf produces a results report



Project Details

Location & Climate Data

Building Data

Area Details

Key Assumptions

RESULTS

Energy Efficiency Measures

17.96%ENERGY SAVINGS

ENERGY kWh/m2/Year

Water Efficiency Measures

27.8% Meets EDGE Water Standard

WATER m3/Year

Materials Efficiency Measures

45.6% Meets EDGE Materials Standard

EMBODIED ENERGY MJ/m2