



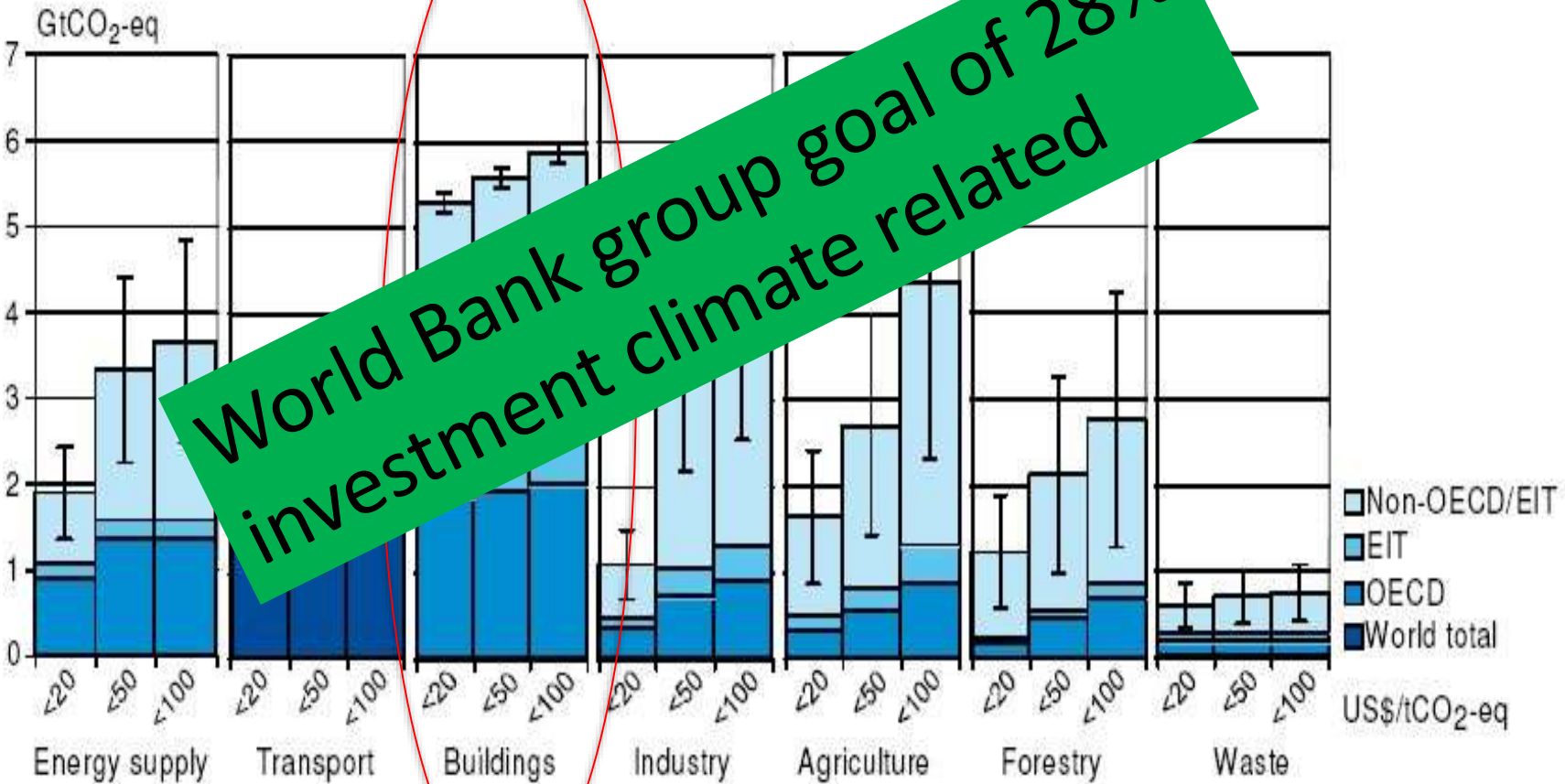
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Investing in Climate *In the Building Sector*

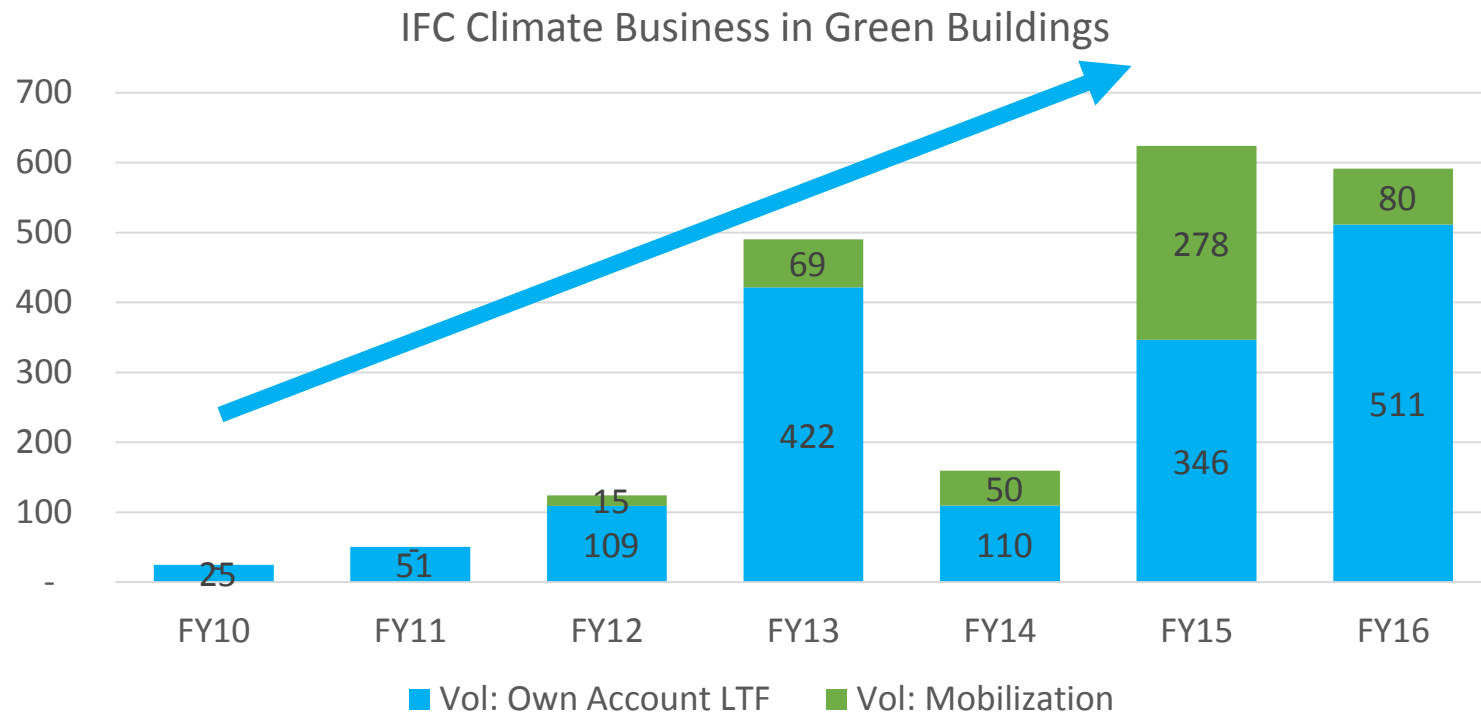
Jane Henley, Green Building Program Lead, CASXI, IFC

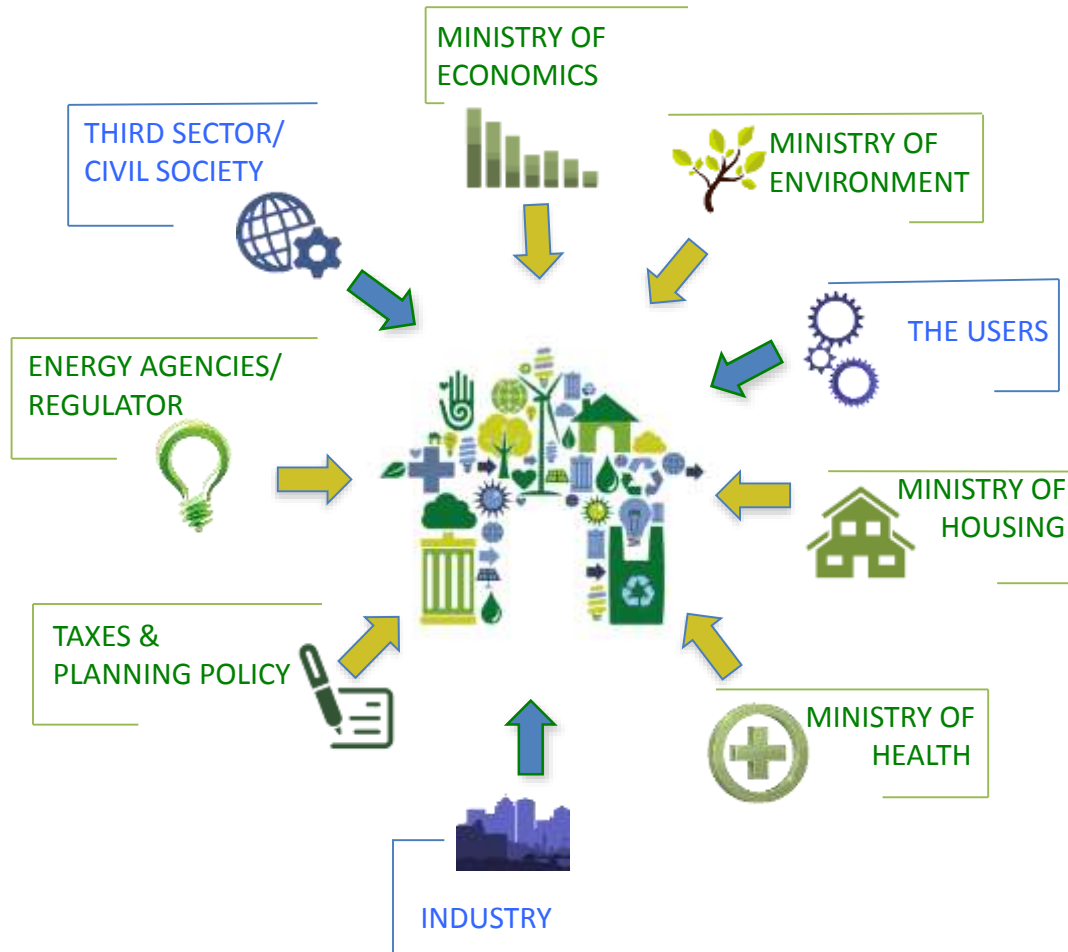
Buildings are our biggest opportunity...



World Bank group goal of 28% investment climate related

GREEN BUILDING INVESTMENTS HAVE BEEN GROWING RAPIDLY





IFC Creating Markets Approach

1. Policy and Technical Assistance (codes, policies, incentives)
2. Stimulating 'Market Dynamics' to encourage industry action
3. Capacity Building – Public and Private
4. Mobilizing Finance

WORKING IN COORDINATION WITH NATIONAL GOVERNMENTS



Government of China



Government of Indonesia



Government of Philippines



Government of Vietnam



Government of Colombia



Government of Panama



Government of Peru



Government of Costa Rica



Government of India



Government of Mongolia

HOW CAN WE MAINSTREAM GREEN BUILDINGS?

EDGE: A FAST, EASY AND AFFORDABLE CERTIFICATION



A metrics-driven, scalable voluntary standard was needed to align the interests of market players, prove the case for building green, and reward innovative design.

Recognizing that this approach was missing, IFC created EDGE. Over 1,000,000 square meters certified to date in 14 countries. Over \$2 billion in IFC's own green investments facilitated.

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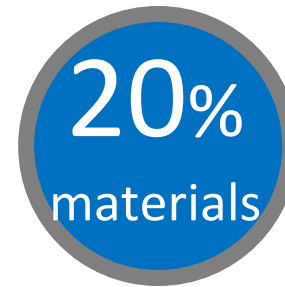
Free Software



Country
baseline and
Standard



Certification



Free at www.edgebuildings.com

EDGE BASELINE

UNIQUE BASELINE DEVELOPED FOR EVERY BUILDING USING CALCULATIONS AT 3 LEVELS

Global

Incorporated in EDGE online software

Energy Calculation Methodology

Water Calculation Methodology

Embodied Energy Calculation Methodology

Carbon Calculation Methodology

Local

Survey data for Baseline development

Operating assumptions

Typical Specifications (or code reqmts.)

Material/ Equipment Costs

Weather and Tariff

Building

Calculate unique baseline & savings

Size, geometry & orientation

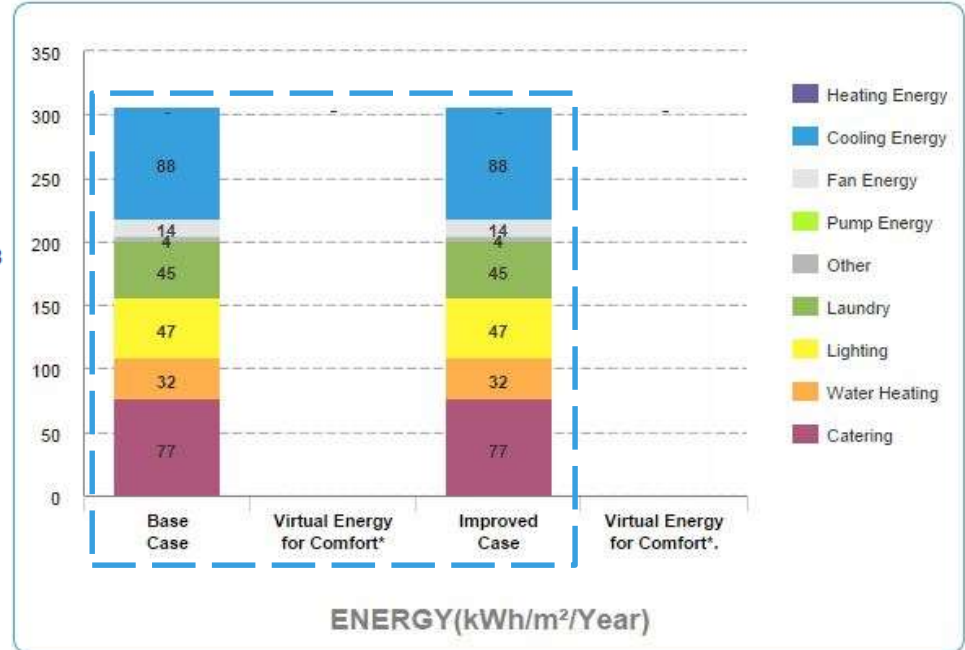
Actual Design Specifications

Homes	Hotels	Retail	Offices	Hospitals
Base Case Utility Cost	402,432	\$/Month	Incremental Cost	0
Utility Costs Reduction		\$/Month	Payback in Years	
				Yrs.

Energy Efficiency Measures

- Reduced Window to Wall Ratio - WWR of 40%
- External Shading Devices - Annual Average Shading Factor (AASF) of 0.58
- Insulation of Roof Surface - U Value of 0.45
- Insulation of External Walls - U Value of 0.45
- Low-E Coated Glass - U Value of 3 W/m² K and SHGC of 0.45
- Higher Thermal Performance Glass - U Value of 1.95 W/m² K and SHGC of 0.28
- Natural Ventilation - Corridors
- Natural Ventilation - Guest Rooms with Auto Controls
- Variable Refrigerant Volume (VRV) Cooling System - COP of 3.45
- Air Conditioning with Air Cooled Screw Chiller - COP of 3.2
- Air Conditioning with Water Cooled Chiller - COP of 5.39
- Ground Source Heat Pump - COP of 4.65
- Absorption Chiller Powered by Waste Heat for Space Heating- COP of 0.7
- Recovery of Waste Heat from the Generator for Space Heating
- Variable Speed Drives on the Fans of Cooling Towers
- Variable Speed Drives Pumps
- Sensible Heat Recovery from Exhaust Air - Efficiency of 60%
- High Efficiency Condensing Boiler for Space Heating - Efficiency of 90%
- High Efficiency Boiler for Water Heating - Efficiency of 90%
- Variable Speed Hoods with Automated Fan Controls

0.00%



Homes

Hotels

Retail

Offices

Hospitals

Base Case Utility Cost 102,432 \$/Month

Utility Costs Reduction 40,040 \$/Month

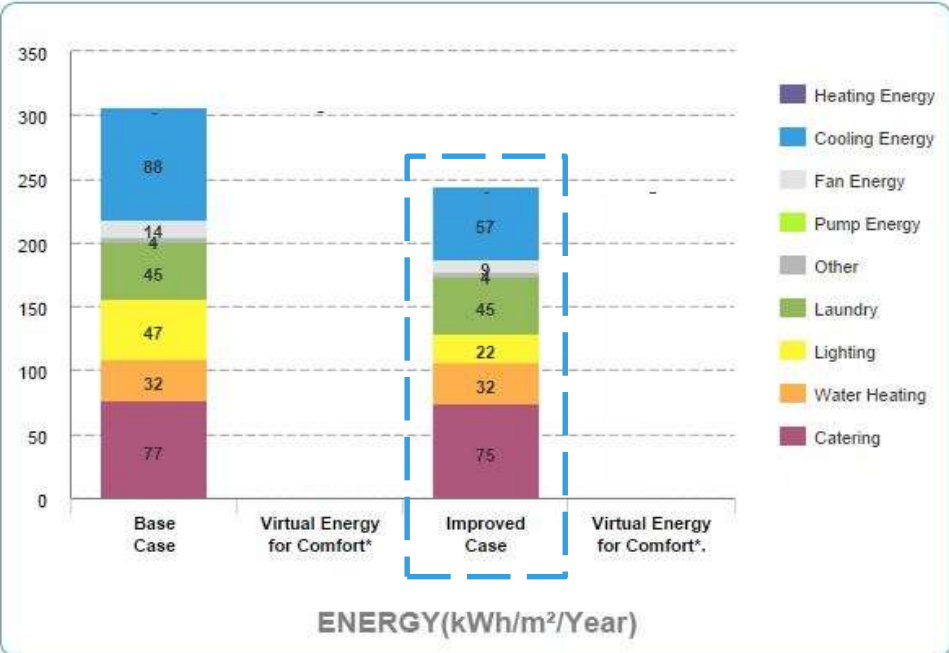
Incremental Cost 915,675 \$

Payback in Years 1.9 Yrs.

Energy Efficiency Measures

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- Variable Speed Hoods with Automated Fan Controls

39.3% Meets EDGE Standard



RESULTS

Final Energy Use kWh/Month/Unit
Final Water Use kL/Month/Unit

Operational CO₂ Savings tCO₂/Year
Embodied Energy Savings MJ

Base Case Utility Costs \$/Month/Unit
Utility Costs Reduction \$/Month/Unit

Version 2.0.0

Design | Energy: 22.33% | Water: 23.7% | Materials: 21.3%

Preliminary

File

- HME01 Reduced Window to Wall Ratio - WWR of 20%
- HME02 Reflective Paint/Tiles for Roof - Solar Reflectivity (SR) of 70%
- HME03 Reflective Paint for External Walls - Solar Reflectivity (SR) of 70%
- HME04 External Shading Devices - Annual Average Shading Factor (AASF) of 0.53
- HME05 Insulation of Roof - U Value of 0.48
- HME06 Insulation of External Walls - U Value of 0.45
- HME07 Low-E Coated Glass - U Value of 3 W/m² K and SHGC of 0.45
- HME08 Higher Performance Glass - U Value of 2 W/m² K and SHGC of 0.28
- HME09 Natural Ventilation
- HME10 Ceiling Fans in all Habitable Rooms
- HME11 Air Conditioning System - COP of 3.5
- HME12 High Efficiency Boiler for Space Heating - Efficiency of 0.9
- HME13 High Efficiency Boiler for Hot Water - Efficiency of 0.9
- HME14 Heat Pump for Hot Water - COP of 3
- HME15 Energy Efficient Refrigerators and Clothes Washing Machines
- HME16 Energy-Saving Light Bulbs - Internal Spaces
- HME17 Energy-Saving Light Bulbs - Common Areas and External Spaces
- HME18 Lighting Controls for Common Areas and Outdoors
- HME19 Solar Hot Water Collectors - 50% of Hot Water Demand

WWR

WFR

SR

SR

AASF

[W/m².k]

[W/m².k]

[W/m².k]

SHGC

[W/m².k]

SHGC

COP

% Eff.

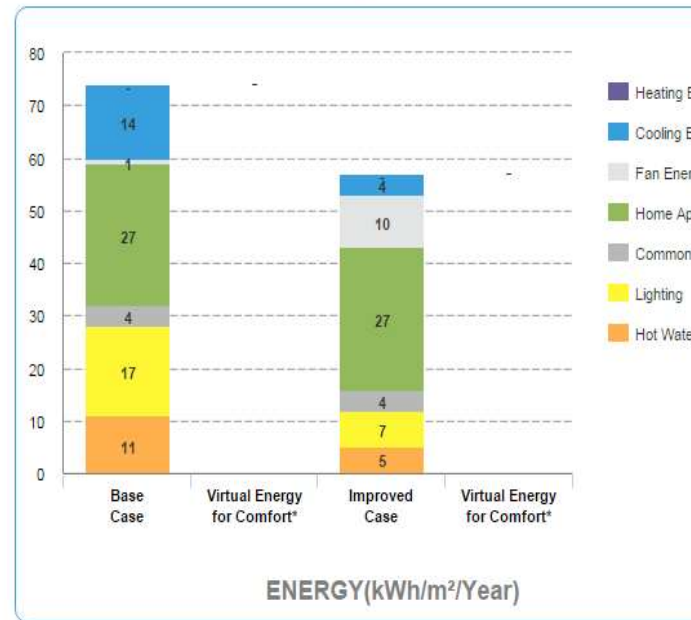
% Eff.

COP

% Hot Water

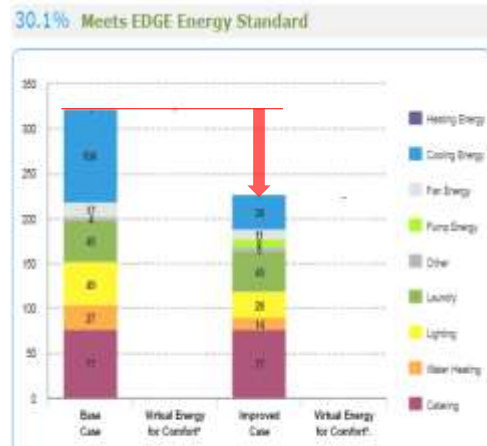
Collector Area (m²/Unit)

22.33% Meets EDGE Energy Standard



*Virtual energy is the amount of energy that will be required based on the assumption that the home or eventually install air conditioning or heating.

EDGE – CCM POSSIBILITIES



RESULTS	
Final Energy Use	282,797 kWh/Month
Final Water Use	201 Lt./Guest/Night
Operational CO ₂ Savings	178 tCO ₂ /Year
Embodied Energy Savings	406 MJ/m ²
Base Case Utility Cost	41,933 \$/Month
Utility Costs Reduction	13,786.11 \$/Month
Incremental Cost	180,671 \$
Payback in Years	1.0921 Yrs.

Final Energy Use	282,797 kWh/Month
Final Water Use	201 Lt./Guest/Night

Futureline Scenario 1 Energy Consumption

Utility Costs Reduction	13,786.11 \$/Month
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Incremental Cost	180,671 \$
Payback in Years	1.0921 Yrs.

Futureline Scenario 1 Utility Reduction & Incremental Costs and Payback

OPPORTUNITIES

1. EDGE for NAMA Baselines (MRV?)
2. Driving the business case with Industry
3. Mobilizing Finance



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