Improve Green Building via Clean Energy

Aiming Zhou

Senior Energy Specialist

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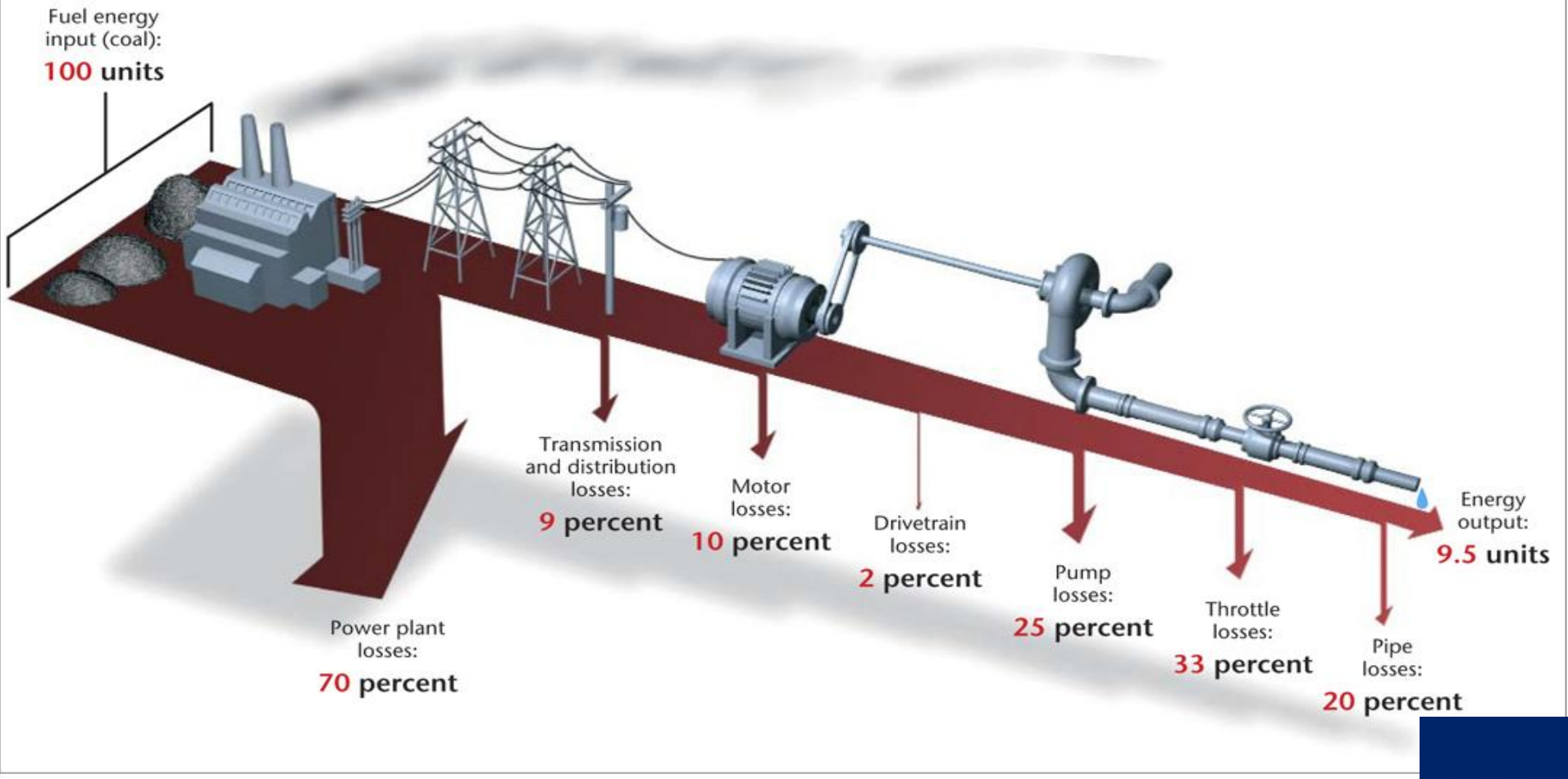
Asian Development Bank

Why

Energy Efficiency Matters

"More than 90% of energy extracted from the ground is wasted before it becomes useful work."



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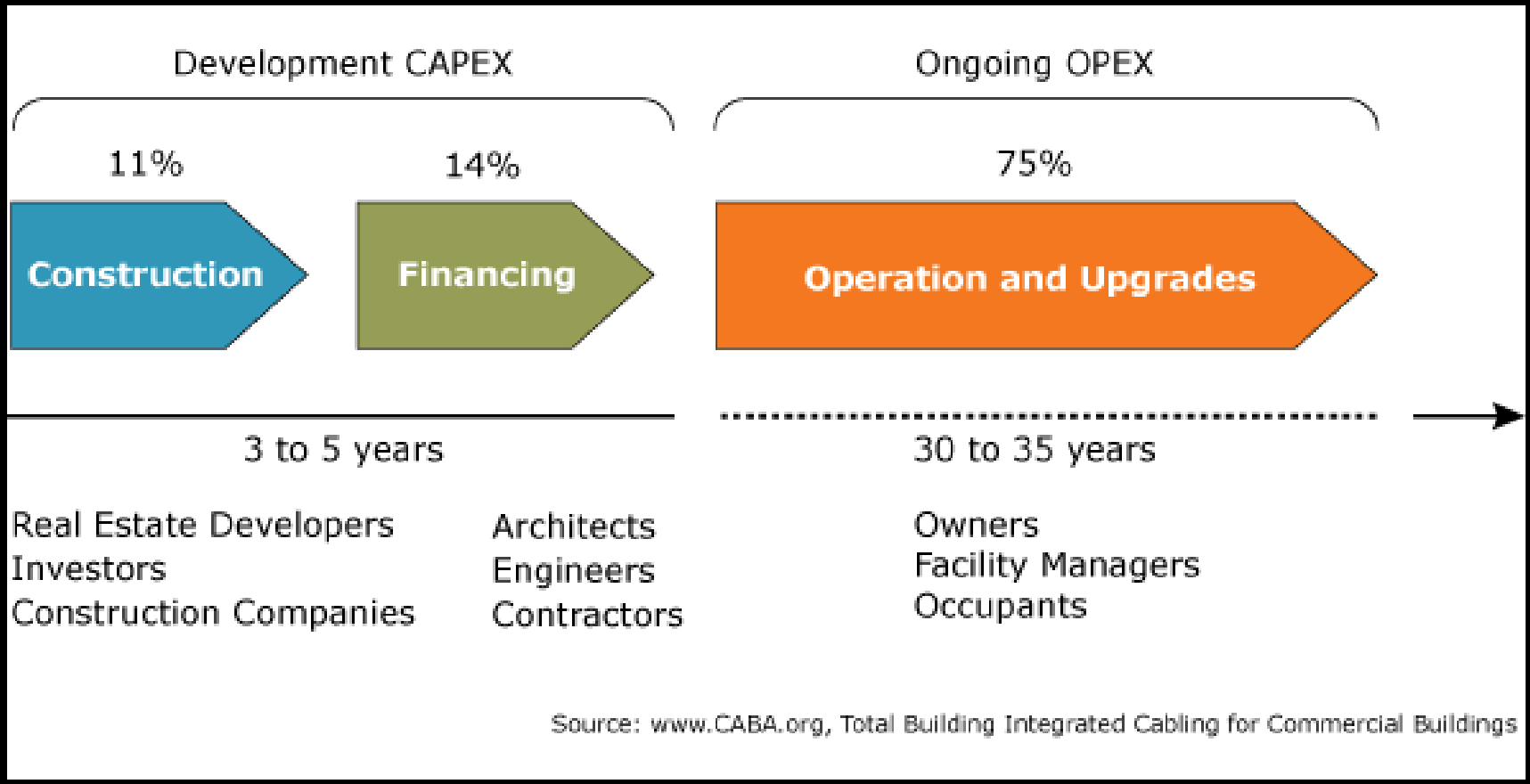
Building Lifecycle Costs

Building life cycle costs = capital investment + operation costs



Energy management minimizes ongoing costs, which is 75% of the life cycle cost of the building.

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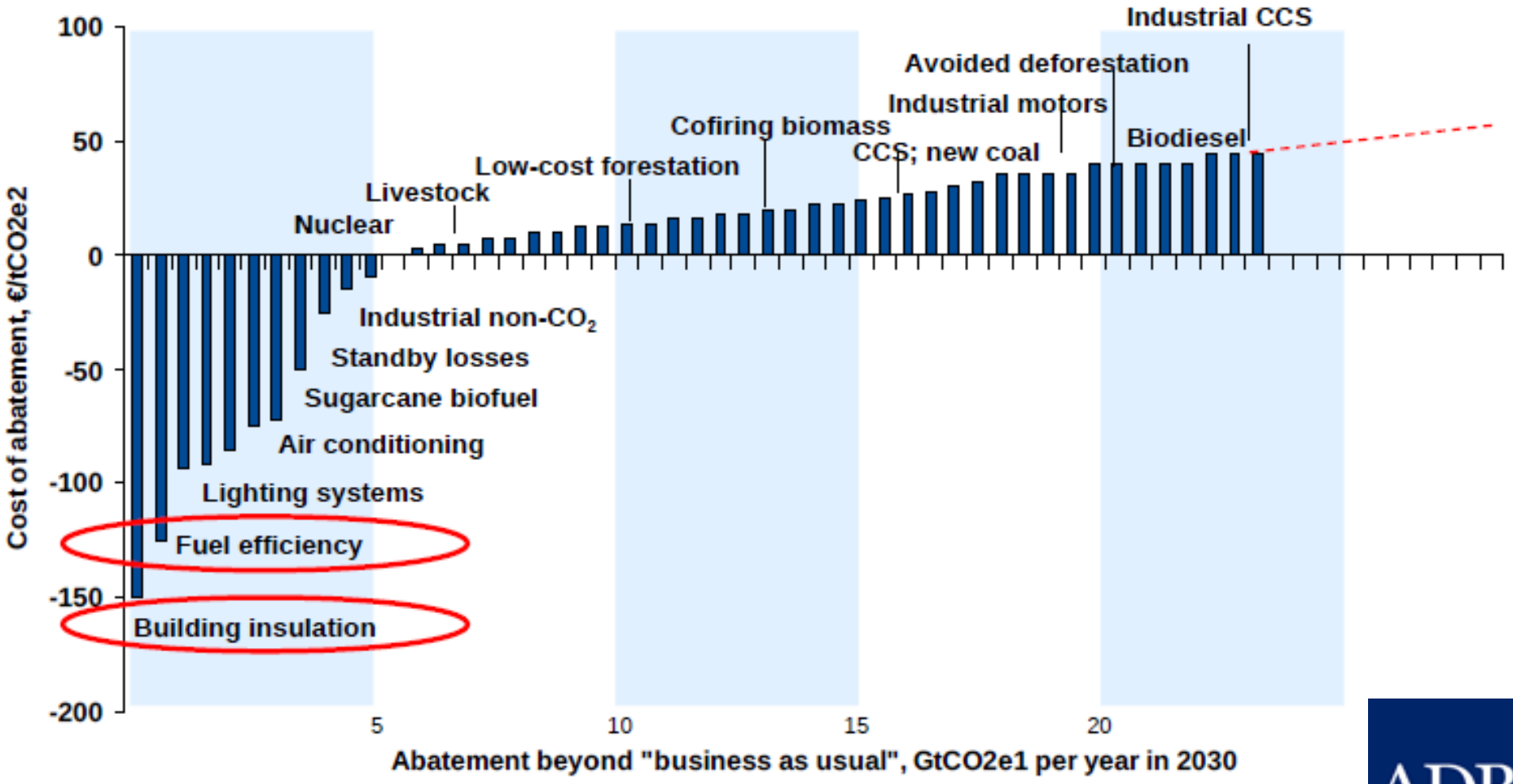
Cheapest Low-Carbon Solution: Energy Efficiency



Source: McKinsey 2007

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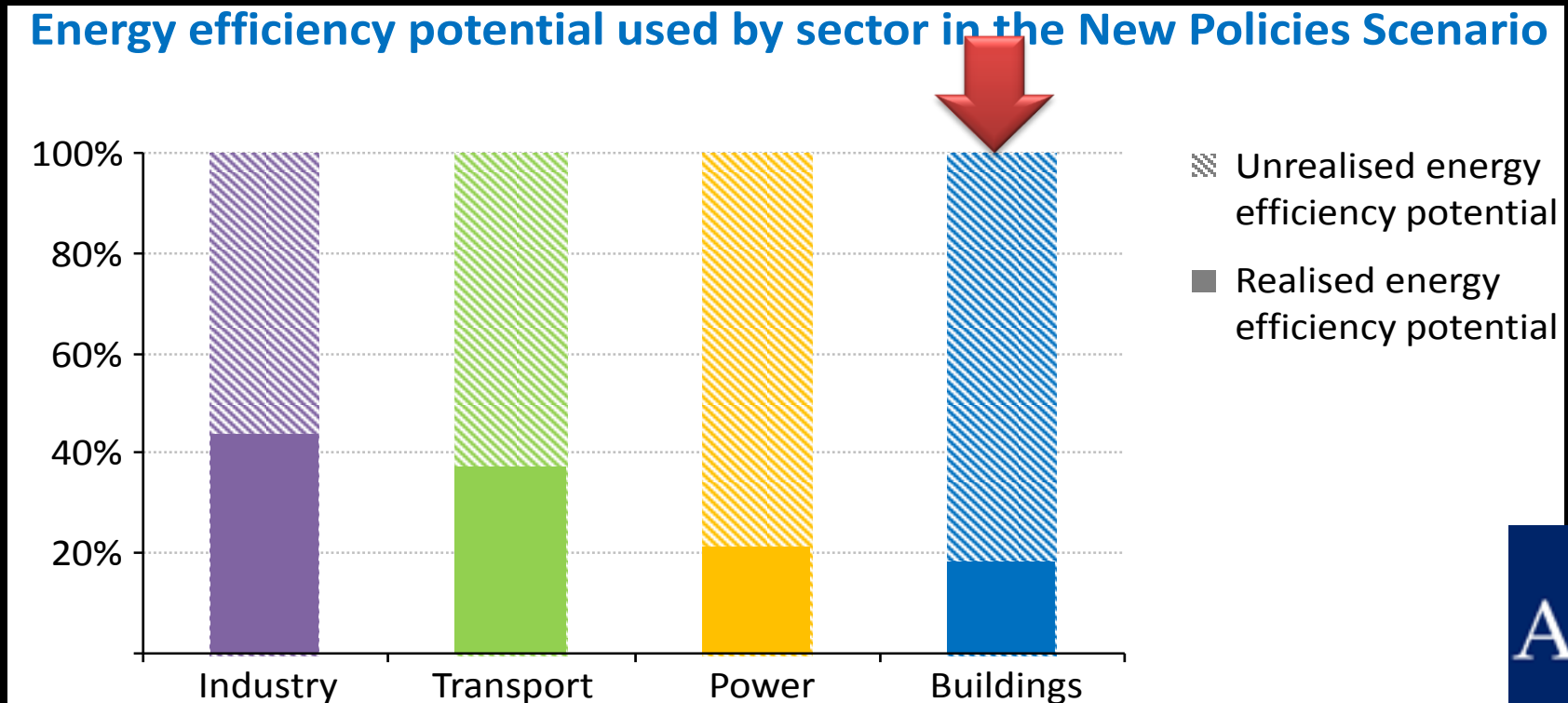
A Huge Opportunity

- **Two-thirds** of the global economic potential of energy efficiency remains untapped to 2035, mostly due to non-technical barriers
- Economically viable efficiency measures can halve world energy demand growth to 2035 and delay "lock-in" of CO_2 emissions permitted under a 2 °C warming trajectory by **five years**
- EE creates net economic gains estimated at $18 trillion to 2035, after additional investments of $11.8 trillion, concentrated in Asia.



How

HOW TO MAKE YOUR BUILDING GREEN

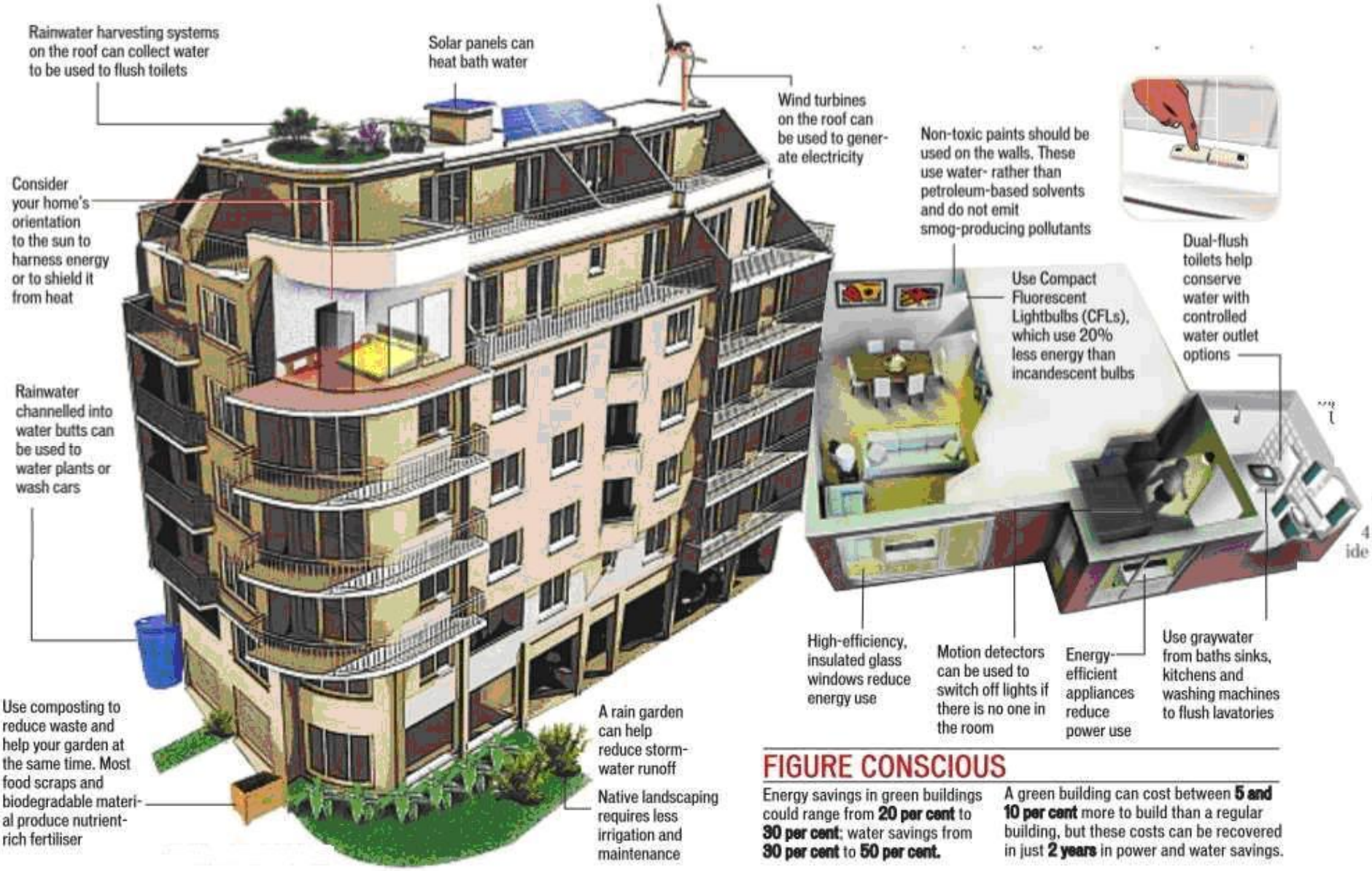
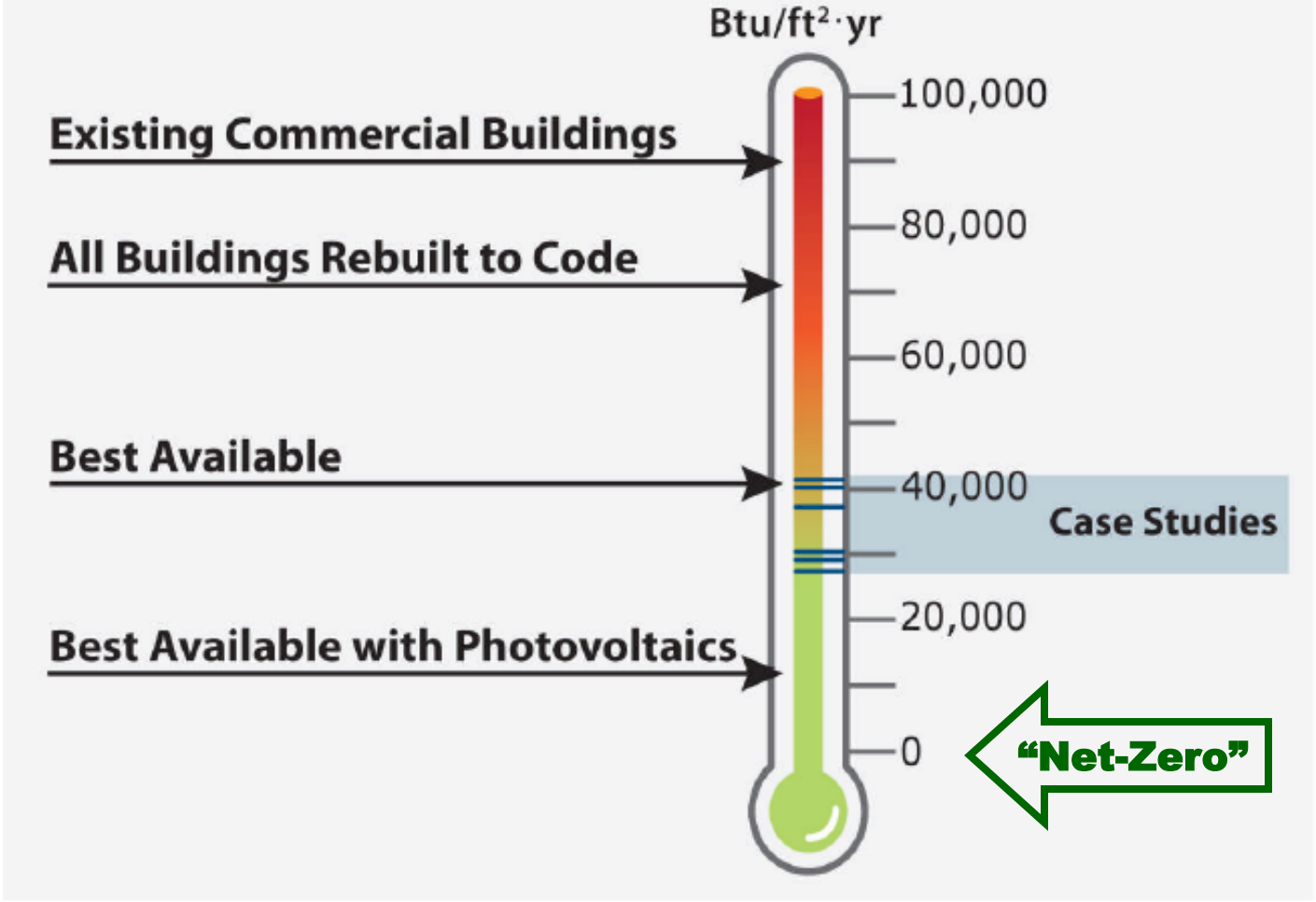


FIGURE CONSCIOUS

Energy savings in green buildings could range from **20 per cent** to **30 per cent**; water savings from **30 per cent** to **50 per cent.**

A green building can cost between **5 and 10 per cent** more to build than a regular building, but these costs can be recovered in just **2 years** in power and water savings.

“Net Zero” Energy – Where Are We Today?



Source: R. Anderson, NREL

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Energy Audit For Buildings

- Walk-Through Audit
- Utility Cost Analysis
- Standard Energy Audit
- Detailed Energy Audit

Payback Period
by Selected Building EE Technology

Green Building Measure	%Saving	Cost increase	Payback period (yr)	Action
• Window to wall ratio	8.0%	Negative	0	Include
• Solar Shading Devices	17.3%	7.2%	25.0	Consider
• Reflectivity - Wall	0.5%	0.0%	4.8	Include
• Thermal Conductance (Wall U-Value)	0.3%	0.5%	98.6	Exclude
• Reflectivity – Roof	0.2%	Negligible	-	Include
• Thermal Conductance – (Roof U-value)	0.1%	0.0%	18.1	Consider
• Glazing Assembly Properties (U-value, SHGC, VLT)	7.3%	0.1%	0.9	Include
• COP of air conditioning equipment	11.4%	1%	5.4	Include
• Variable Speed Drives for cooling towers	9%	0%	0	Include
• Heat recovery on extract air	2%	Cost awaiting	26.2	Consider
• Solar collectors for Hot water	NA	NA	---	Exclude
• Photo electric control perimeter lighting	18%	2%	7.4	Include
• Exterior lighting controls	NA	NA	---	Exclude
• Low energy lighting [CFL, T5, LEDs etc]	7%	0.12%	1.0	Include
• Electronic Ballast	2%	Negligible	0.0	Include
• Sub-metering benefits	3%	NA	NA	Consider
• Water efficient fittings	40%	0.35%	6.0	Include
• Rainwater harvesting	15%	Cost awaiting	26.2	Consider
• Recycling onsite Sewage T plant	67%	Cost awaiting	7.4	Consider
• Water metering	NA	Negligible	NA	Include
• Storm water attenuation and ground water recharge	NA	Minimal impact	NA	Include

The energy saving potential of each measure has been correlated with the cost impact and therefor the simple payback.

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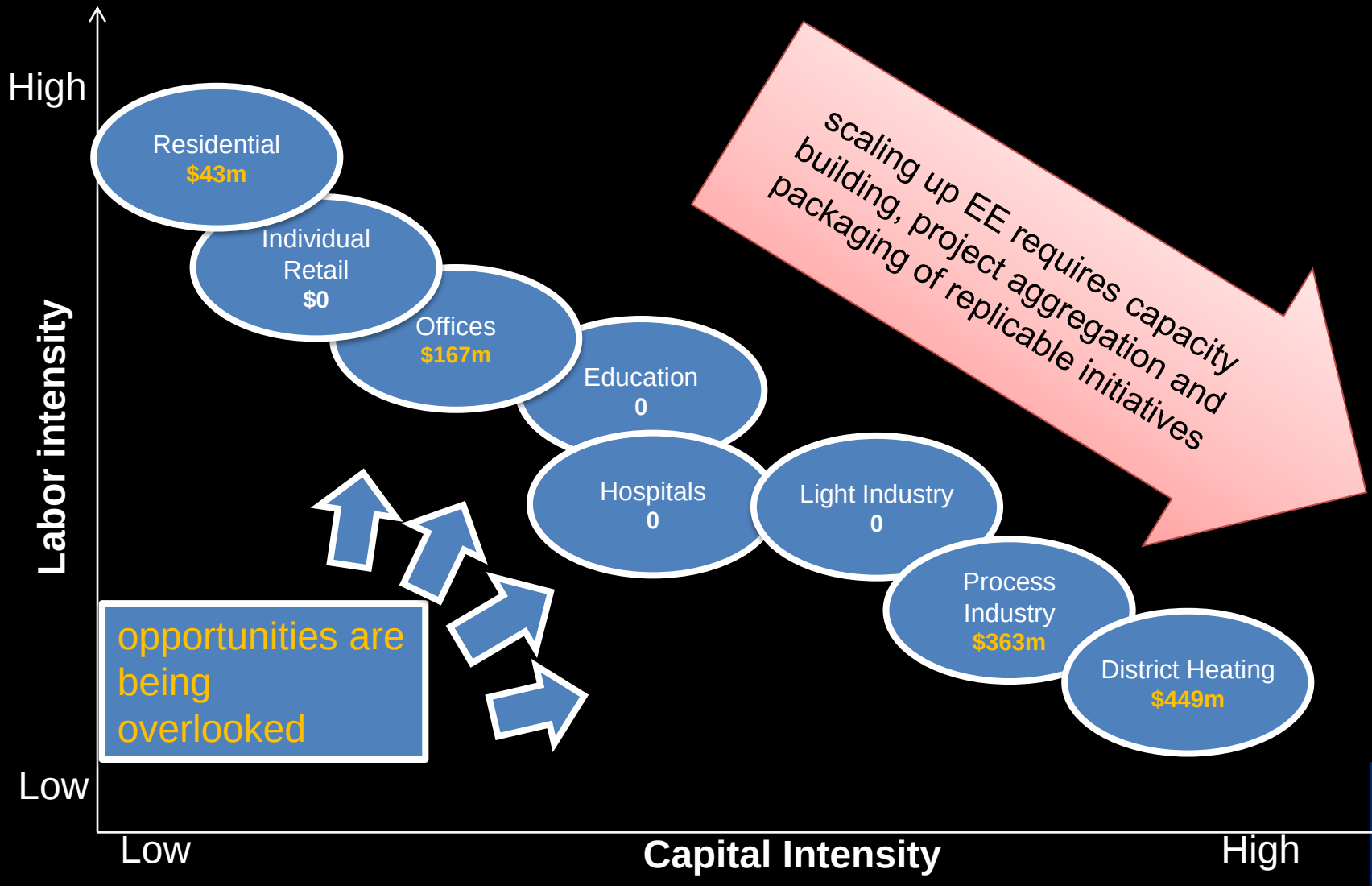
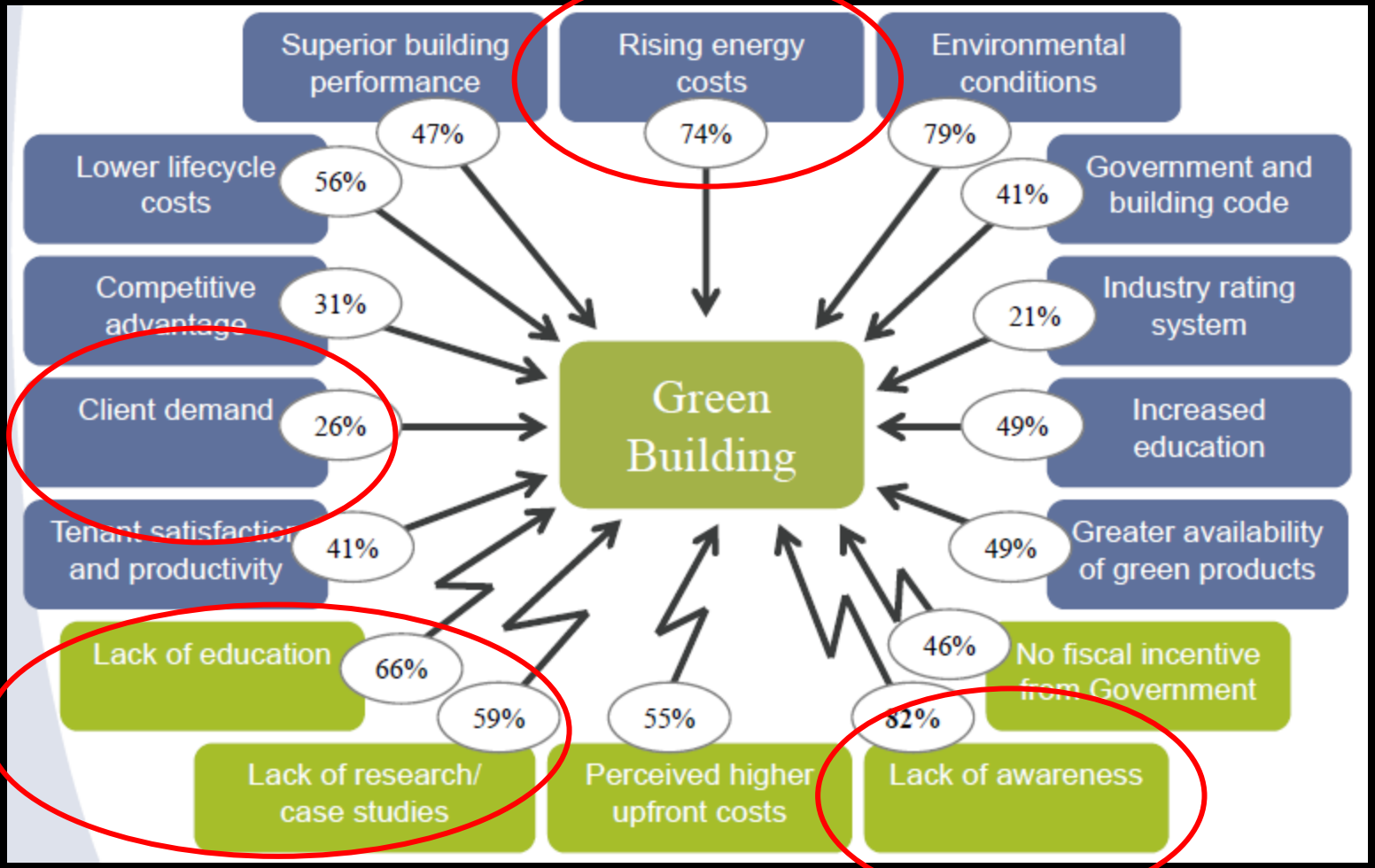
Why Low Hanging Fruits Unpicked

ADB's Demand-Side Energy Efficiency Investment



GB Barriers and Drivers

Green Building Market Report, BCI Asia 2008



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Sample Projects

ADB HQ Showcases Sustainability
"OAS at Work"

2002
ADB Environment Policy

2003
Environment, Health and Safety Policy

2004
Six Sigma Program

2007
Sustainability Report

2009
LEED Certification Process (Gold in 2011)

2011 beyond
Sustainability at ADB HQ

2012
Energy Management 50001


PRIUS
6357

Before

After

Photo Credit: OAS, ADB

U.S. GREEN BUILDING COUNCIL
LEED GOLD
USGBC

ASIAN DEVELOPMENT BANK HEADQUARTERS

Mandaluyong, Philippines

HAS SUCCESSFULLY ACHIEVED THE FOLLOWING LEVEL OF CERTIFICATION ESTABLISHED BY THE U.S. GREEN BUILDING COUNCIL IN THE LEED GREEN BUILDING RATING SYSTEM™ AND VERIFIED BY THE GREEN BUILDING CERTIFICATION INSTITUTE.

LEED FOR EXISTING BUILDINGS: OPERATIONS AND MAINTENANCE

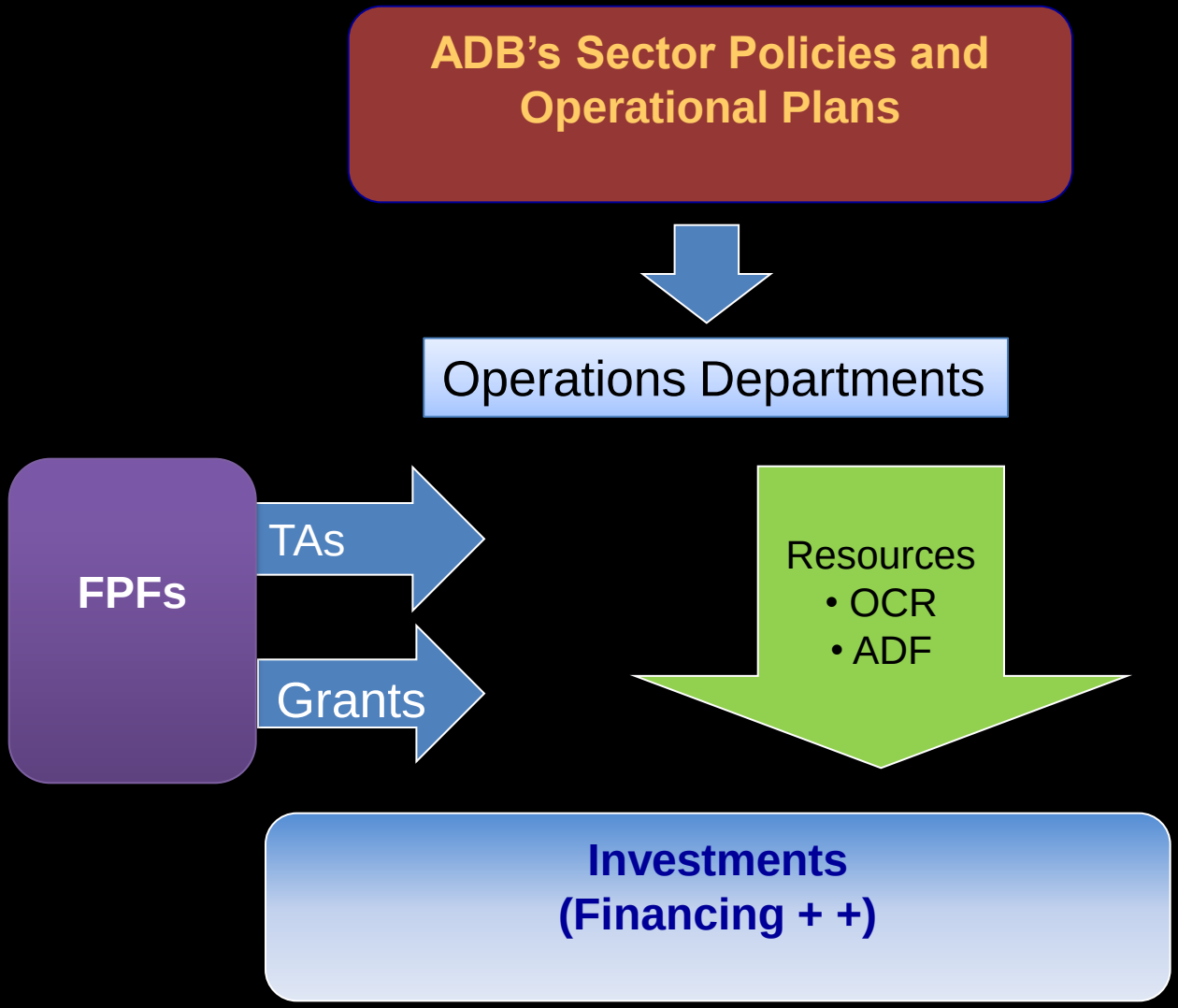
GOLD

June 2011

S. RICHARD FEDRIZZI, PRESIDENT & CEO
U.S. GREEN BUILDING COUNCIL

PETER TEMPLETON, PRESIDENT
GREEN BUILDING CERTIFICATION INSTITUTE

Sustainable Infrastructure Financing in ADB



Structure of CEFPF