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ASIA LOW CARBON BUILDINGS TRANSITION PROJECT

Life Cycle Assessment for Transitioning to a Low-Carbon Economy

4.1 Financing Low Carbon Buildings

November 2024

ASEAN CENTRE FOR ENERGY ACE

EESL

HEAT

Supported by:

Federal Ministry for Economic Affairs and Climate Action

IKI INTERNATIONAL CLIMATE INITIATIVE

on the basis of a decision by the German Bundestag

WHAT WILL YOU LEARN?

- Low carbon buildings: Additional cost implications
- Building sector green finance opportunity and market size

- Financial and fiscal instruments for funding

- European Union taxonomy
- Blended finance
- Assessing risks and opportunities associated with energy efficiency investments

- Beneficial financing terms to developers and buyers
- Green loans
- Green mortgages
- Loans for retrofit and renovation of buildings

- Case examples

FINANCING LOW CARBON BUILDINGS

Issues and concerns

Financing of business-as-usual conventional buildings is traditionally well established. However, attracting finance for low carbon buildings can be a challenge due to the following reasons:

- **Lack of awareness about the concept of low carbon buildings**
- **Lack of confidence among stakeholders about low carbon technologies and building features delivering the claims of energy and cost savings**
- **Insufficient information about the extent of higher capital investment demanded by low carbon buildings**
- **Apprehension of builders about losing market share due to higher premiums for low carbon buildings, especially since the major financial benefit over the lifetime of the building is to the buyer and not to the builder**
- **Reluctance of prospective buyers to pay premiums for low carbon buildings due to lack of awareness about operational savings**
- **Buyer interest in energy savings reduces when buildings are not self-occupied, and the benefits of energy cost savings go to the tenants**
- **Absence of government incentives to at least partially offset the higher cost of low carbon (green) buildings**
- **Doubts about the market size that prevent banks and financial institutes evolving robust 'off-the-shelf' loan products for financing low carbon buildings and other sustainability projects**

LOW CARBON BUILDINGS

Cost implications

Green Residential Building

Reduces utility bills, waste output and maintenance costs

- Lowers operating expenses
- Improves resource efficiency

Saves more than 20% on energy and water consumption

Average 15%–20% reduction in utility bills for homeowners

Green buildings that incorporate recycling can reduce waste output by 90% and use 30% less energy, equating to a 5% increase in net operating income compared to traditional buildings

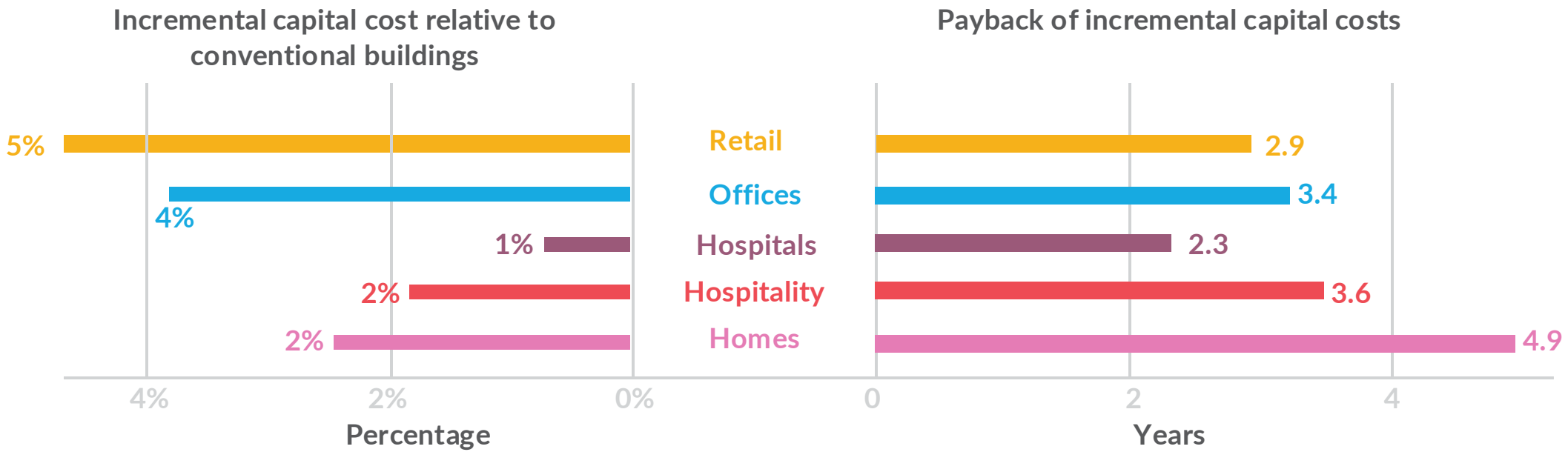
18%–37% lower operating costs than traditional buildings

Green Commercial Building

Source: International Finance Corporation, 2019

LOW CARBON BUILDINGS

Cost implications



The incremental costs in the range of 1% to 5% has payback periods in the range of 2.3 years to 4.9 years

Note: Incremental capital costs are the ratio of incremental cost over typical construction costs

Source: International Finance Corporation, 2023

LOW CARBON BUILDINGS

Case example: Additional cost and payback

In Indonesia, the EDGE-certified Citra Maja Raya development reported the additional cost of green measures to be **4.7%, with a payback period of 1.8 years**

The green measures included:

- **Optimum window sizing**
- **External shading**
- **Insulation of roof and external walls**
- **Natural ventilation**
- **Energy and water efficient systems**

The utility savings per year amount **to 30%**. Some residents reported that their monthly **utility bill decreased from an equivalent of USD55 in previous non-green housing to USD14**

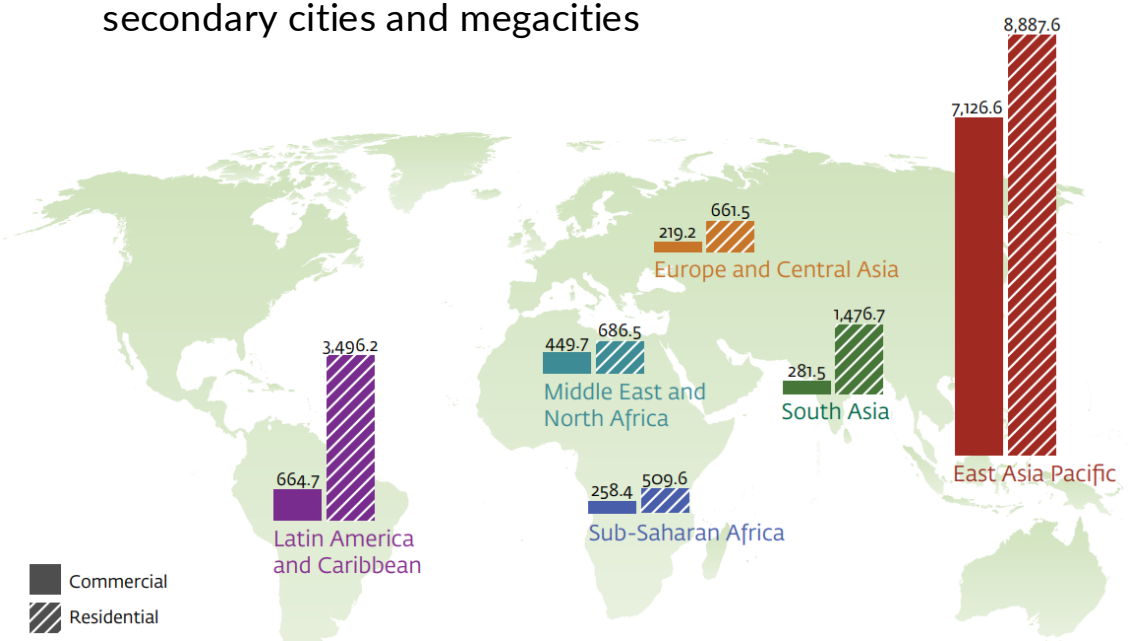
Citra Maja Raya Housing Estate, Indonesia

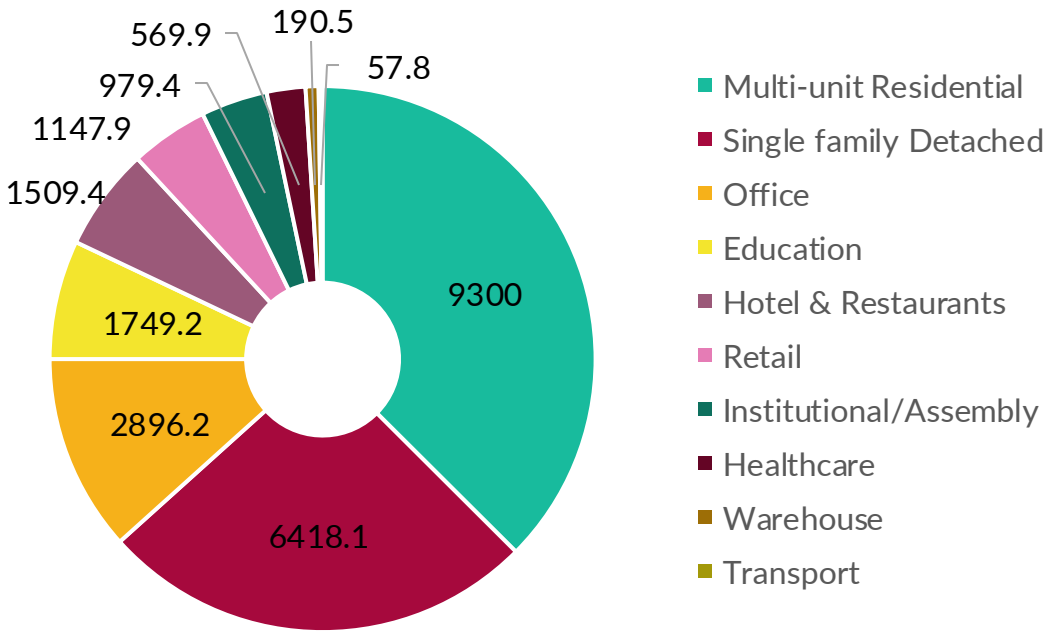
Image: https://www.kokogiovanni.com/2018/11/rumah-murah-cluster-sanur-persembahan-citra-maja-raya.html

MARKET POTENTIAL

Global projections for green buildings

- The market potential for green buildings is estimated to reach USD24.7 trillion by 2030 across emerging market cities with populations exceeding half a million, with the residential sector representing USD15.7 trillion of this opportunity
- The East Asia Pacific region alone presents a green building investment opportunity of USD16 trillion, accounting for over half of the total opportunity across all emerging markets
- South Asia holds a USD1.8 trillion investment potential in green buildings, primarily driven by rapidly growing secondary cities and megacities





Source: International Finance Corporation, 2019

FINANCING LOW CARBON BUILDINGS

Need of the hour: Innovative green financing for the building sector

- Banks and financial institutes play an important role in mobilizing funds to achieve climate change goals. Innovative financial products supporting the transition to a low carbon economy are being developed and gaining acceptance
- Presently, green financing in most countries is primarily focused on renewable energy, electric mobility, industrial energy efficiency, water and agriculture. Low carbon green buildings have yet to attract significant attention
- *Green bonds* appear to be gaining traction in the financial markets of both developed and emerging economies, and are expected to be the way forward for funding sustainability projects
- *Blended finance*, where investors with different risk tolerances participate in the same project, offers an effective way to secure capital for sustainability projects

FINANCING LOW CARBON BUILDINGS

Clarity on project transactions

- Who will invest in the assets?
- What are the minimum performance obligations?
- What are the minimum payment obligations?
- What is the payment mechanism and security structure?
- What happens to the assets at the end of the term of the contract?
- Have technical issues been addressed to eliminate disputes and uncertainties?
- Have user-specific technical and business problems been addressed?
- Baseline data, measurement and verification protocols?

Clarity on the above issues is a prerequisite for successfully implementing business models

FINANCING LOW CARBON BUILDINGS

Essentials for a contract

Energy efficiency projects are medium-term contract-driven businesses. Standard formats for energy services agreements help streamline business models, provide minimum safeguards to honor obligations and resolve disputes. Some of the prerequisites are:

- Precise definition of scope of services
- Clear delineation of responsibilities for all parties involved
- Establishment of baselines
- Enforce minimum and guaranteed performance standards
- Determine measurement and verification protocols
- Enforce minimum and guaranteed payment obligations
- Devise payment and security structure for suitable collateral and delayed payment risk
- Evolve clear-cut energy services billing procedures
- Put in place termination valuation formulas
- Take or pay protection for lenders
- Address potential areas of dispute

FINANCIAL INSTRUMENTS

Categories

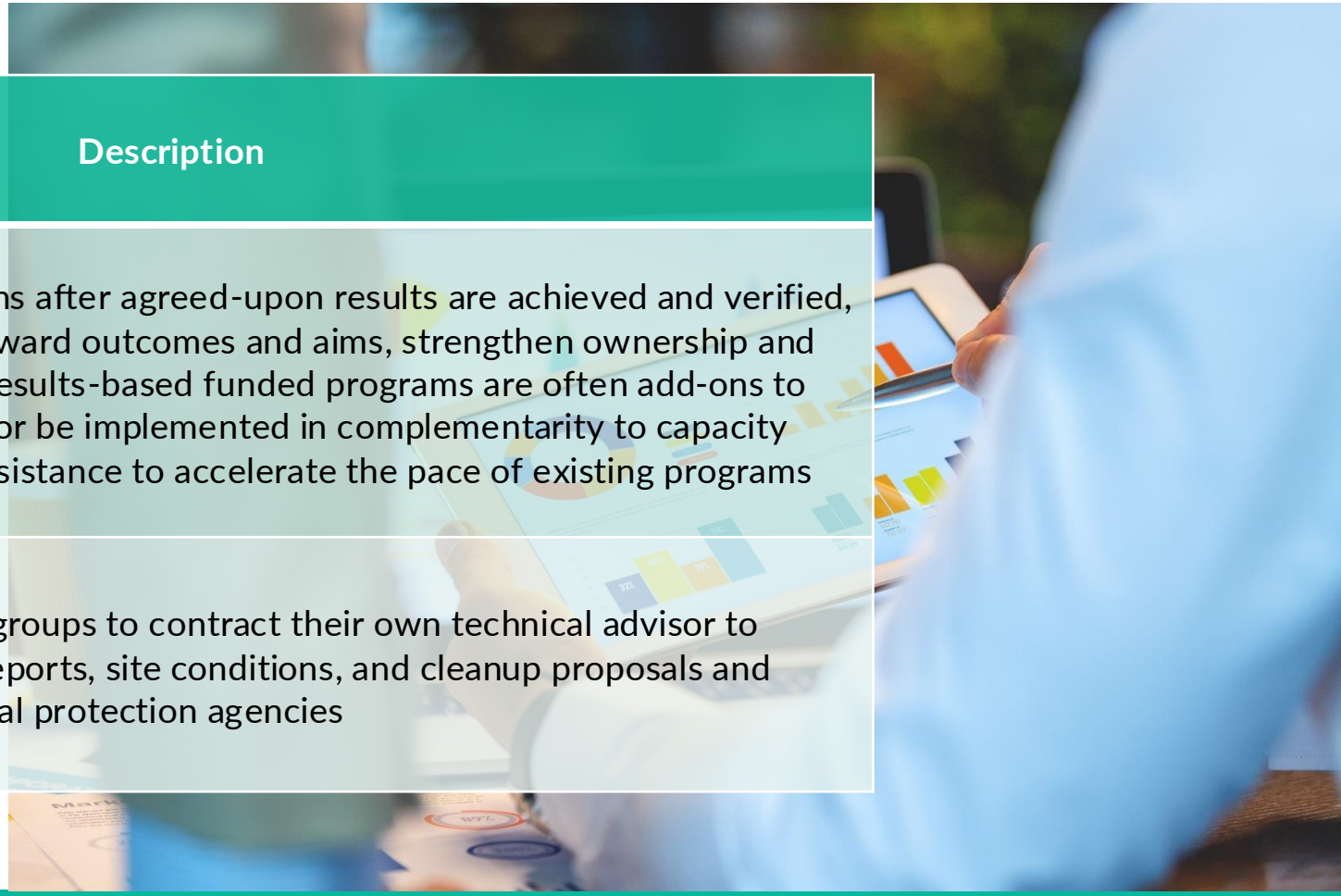
- The financial sector offers various instruments, both traditional and specialized, which can be categorized into grants, debts, equities, structured finance models, risk mitigation models, asset finance models and other innovative models packaged to meet the demands of the global sustainability drive
- Additionally, government bodies are offering incentives and disincentives through fiscal instruments
- Not all instruments have the same role in the net zero buildings transition. Some can only be used in certain contexts while others only allow for a subset of building improvement measures
- Overall, there is no one financial instrument that covers all the needs of a net zero transition. Reaching net zero in the buildings sector requires all building types, all technical elements, and all recipients to be served. Rarely will a standard financial instrument be able to address all issues adequately
- Considering the specific demands of sustainability projects, there is scope for innovation and customization of financial instruments. This modules gives an overview of financial and fiscal instruments that can be considered, depending on the customization required, with reference to the specific demands of the project

Source: LaSalle et al., 2022

FINANCIAL INSTRUMENTS

Grants from international bilateral agencies

Instrument	Description
Result-based grant	Rewards individuals or institutions after agreed-upon results are achieved and verified, which helps to shift the focus toward outcomes and aims, strengthen ownership and provide incentives to perform. Results-based funded programs are often add-ons to other programs and can include or be implemented in complementarity to capacity building activities or technical assistance to accelerate the pace of existing programs
Technical assistance grant	Provides funding to community groups to contract their own technical advisor to interpret and explain technical reports, site conditions, and cleanup proposals and decisions issued by environmental protection agencies

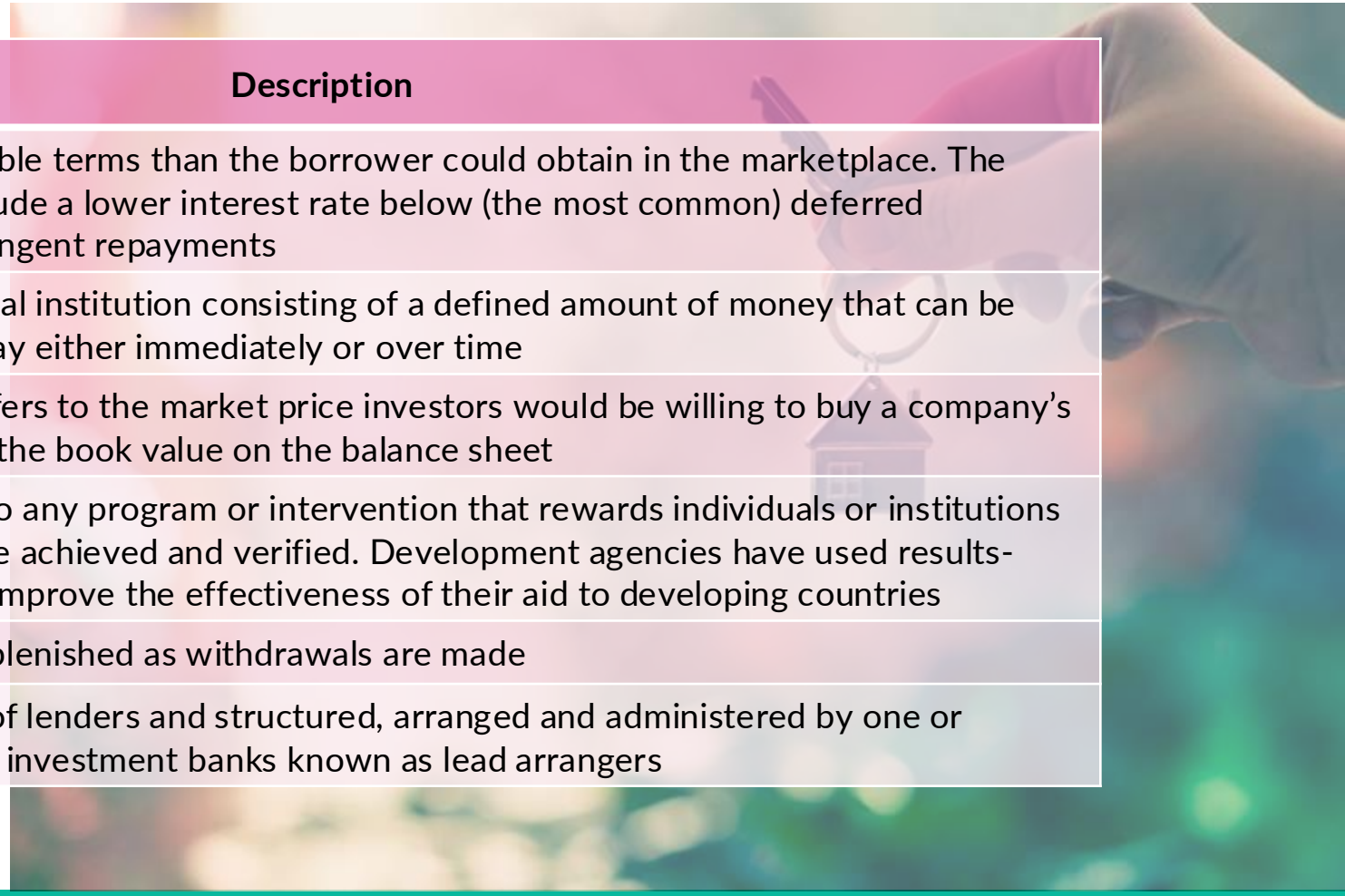


Source: Purnomo et al., 2024

FINANCIAL INSTRUMENTS

Debt financing

Instrument	Description
Concessional loan	A loan made on more favorable terms than the borrower could obtain in the marketplace. The concessional terms may include a lower interest rate below (the most common) deferred repayments or income-contingent repayments
Credit line	A flexible loan from a financial institution consisting of a defined amount of money that can be accessed as needed and repay either immediately or over time
Market-rate debt	The market value of debt refers to the market price investors would be willing to buy a company's debt for, which differs from the book value on the balance sheet
Results-based loan	An umbrella term referring to any program or intervention that rewards individuals or institutions after agreed-upon results are achieved and verified. Development agencies have used results-based financing as a tool to improve the effectiveness of their aid to developing countries
Revolving fund	A fund that is continually replenished as withdrawals are made
Syndicated loan	A loan provided by a group of lenders and structured, arranged and administered by one or several commercial banks or investment banks known as lead arrangers



Source: Purnomo et al., 2024

FINANCIAL INSTRUMENTS

Debt financing

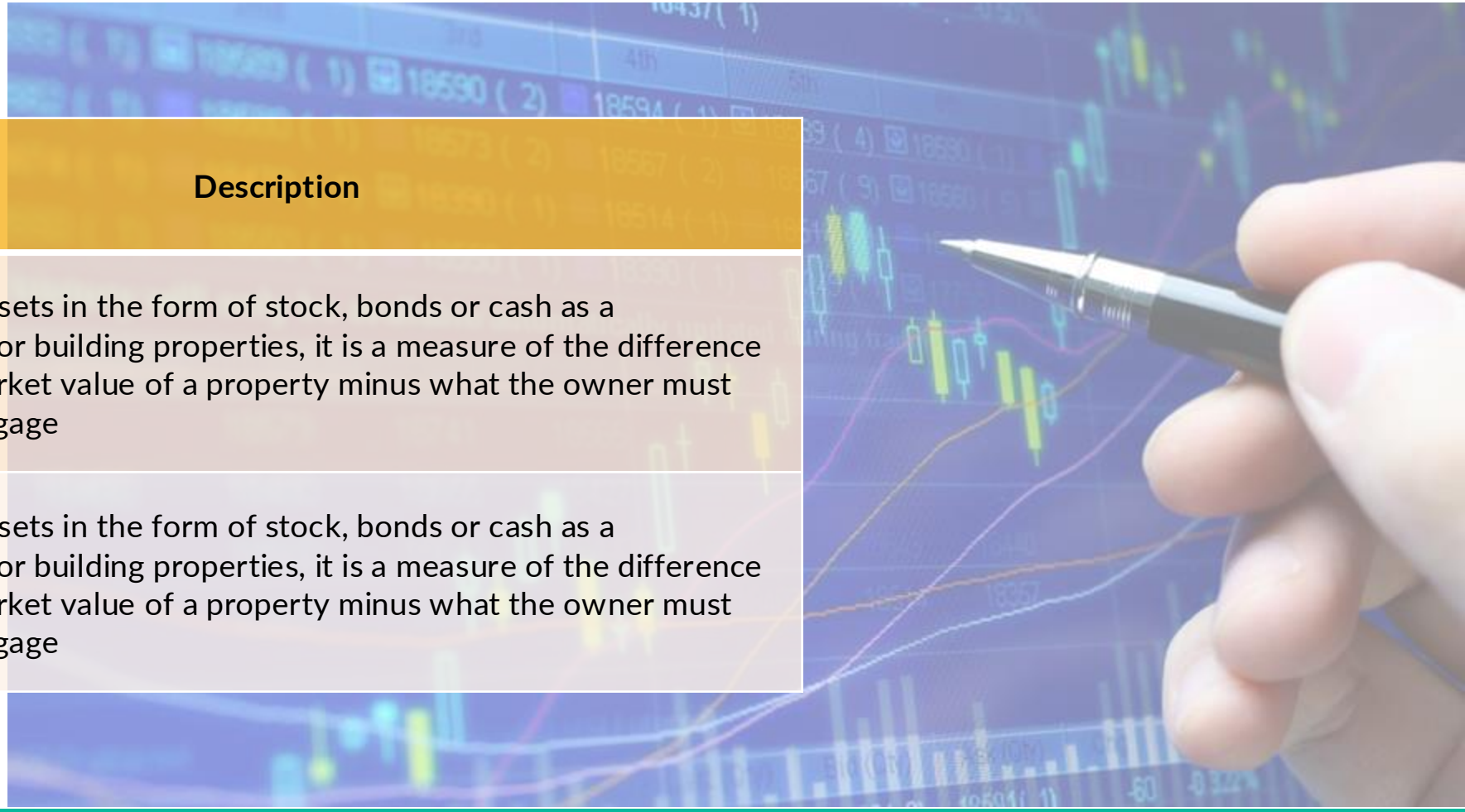
Instrument	Description
Green mortgage	A mortgage specifically targeted at green buildings. As an incentive for the borrower to either buy a green building or renovate an existing one to make it greener, the bank would offer either a lower interest rate or an increased loan amount
Catastrophe bond / insurance pool	Risk-linked securities that transfer a specified set of risks from a sponsor to investors
Green corporate / obligation bond	A green bond is differentiated from a regular bond in that it signifies a commitment to exclusively use the funds raised to finance or refinance green projects, assets or business activities
Green project / municipal bond	Any type of bond instrument where the proceeds will be exclusively applied to finance or refinance in part or in full new and/or existing eligible projects that provide clear environmental benefits, which are assessed and quantified by the issuer where feasible
Green sukuk	The green label indicates that the sukuk is compliant with green bond standards, principles and framework. The proceeds of green bonds are used to finance climate change mitigation, climate change adaptation and environmental projects

Source: Purnomo et al., 2024

FINANCIAL INSTRUMENTS

Equities

Instrument	Description
Private equity	Ownership of assets in the form of stock, bonds or cash as a 'shareholding'. For building properties, it is a measure of the difference between the market value of a property minus what the owner must pay on the mortgage
Public equity	Ownership of assets in the form of stock, bonds or cash as a 'shareholding'. For building properties, it is a measure of the difference between the market value of a property minus what the owner must pay on the mortgage



Source: Purnomo et al., 2024

FINANCIAL INSTRUMENTS

Structured finance

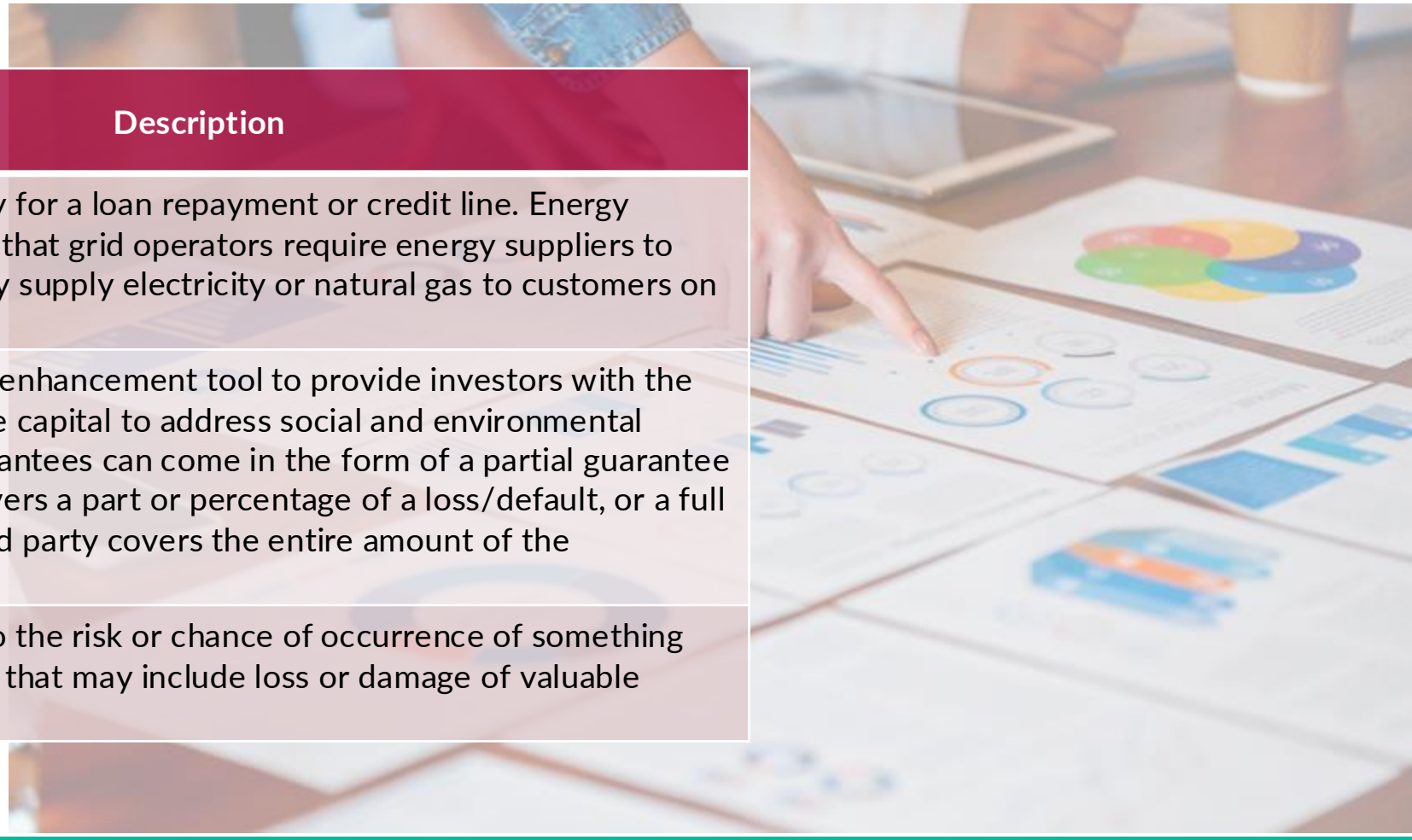
Instrument	Description
Aggregation platform	Platform for a group of companies or local institutions to partner together to buy energy from a single developer or multiple developers at smaller volumes while retaining the economic advantages of a high-volume purchase
Land banking / land readjustment	An effective tool in allowing local governments to take on regeneration projects through increased land values while engaging and involving the original residents and landowners as stakeholders
Pooled procurement for green financial product or building	Combines financial and other resources of purchasing authorities to improve efficiency and create greater purchasing power for green financial products or buildings
Securitization / Asset-backed securities (ABS)	A type of financial investment that is collateralized by an underlying pool of assets – usually one that generates a cash flow from debt, such as loans, leases, credit card balances or receivables

Source: Purnomo et al., 2024

RISK MITIGATION INSTRUMENTS

From banks and financial institutes

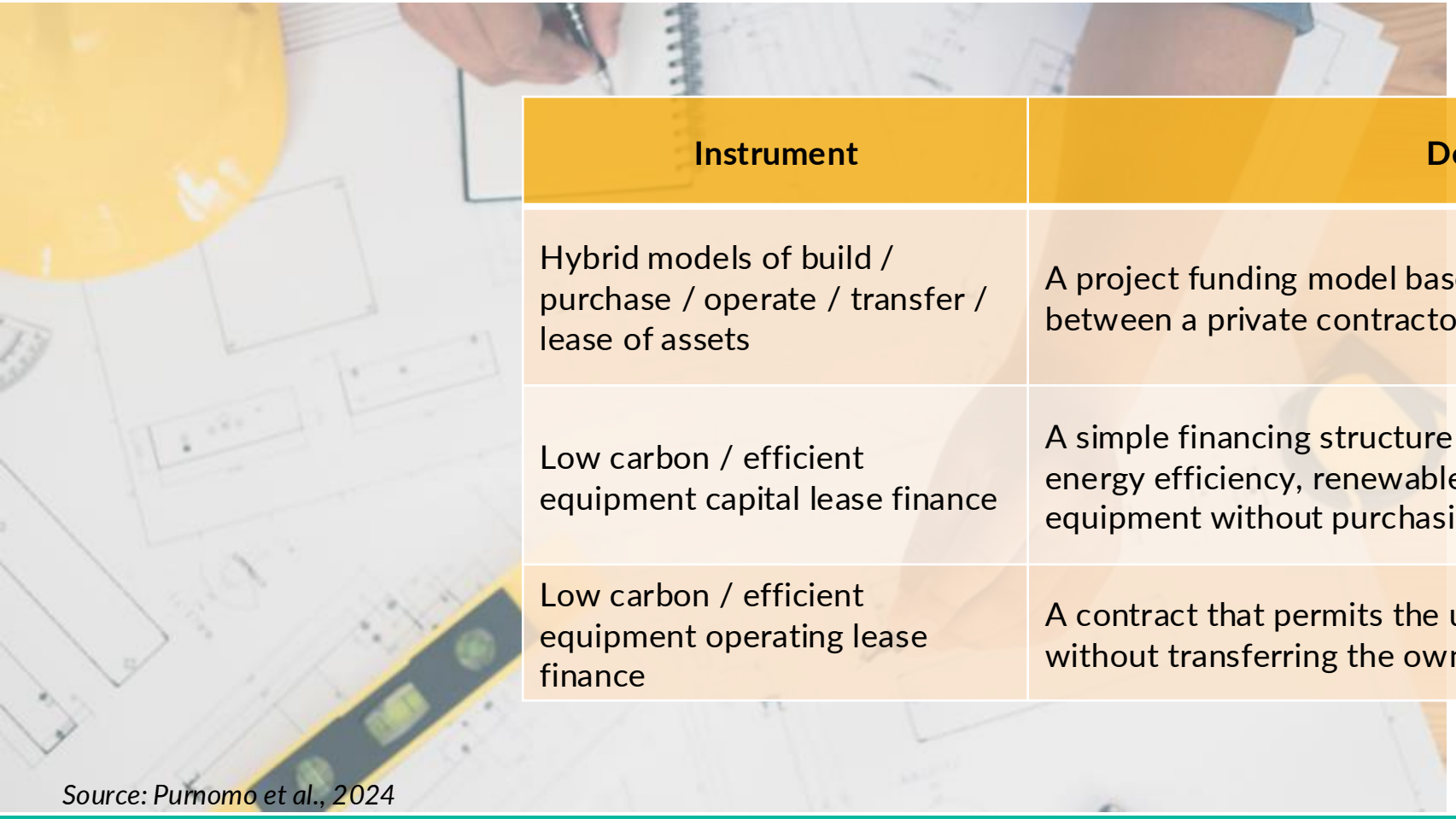
Instrument	Description
Collateral	Pledge to offer security for a loan repayment or credit line. Energy collateral is the money that grid operators require energy suppliers to post in order to actively supply electricity or natural gas to customers on that grid
Full or partial credit guarantee	A guarantee is a credit enhancement tool to provide investors with the ability to leverage more capital to address social and environmental challenges. Credit guarantees can come in the form of a partial guarantee where a third party covers a part or percentage of a loss/default, or a full guarantee where a third party covers the entire amount of the loss/default
Risk insurance product	Risk insurance refers to the risk or chance of occurrence of something harmful or unexpected that may include loss or damage of valuable assets



Source: Purnomo et al., 2024

ASSET FINANCE MODELS

Between customers and solution providers



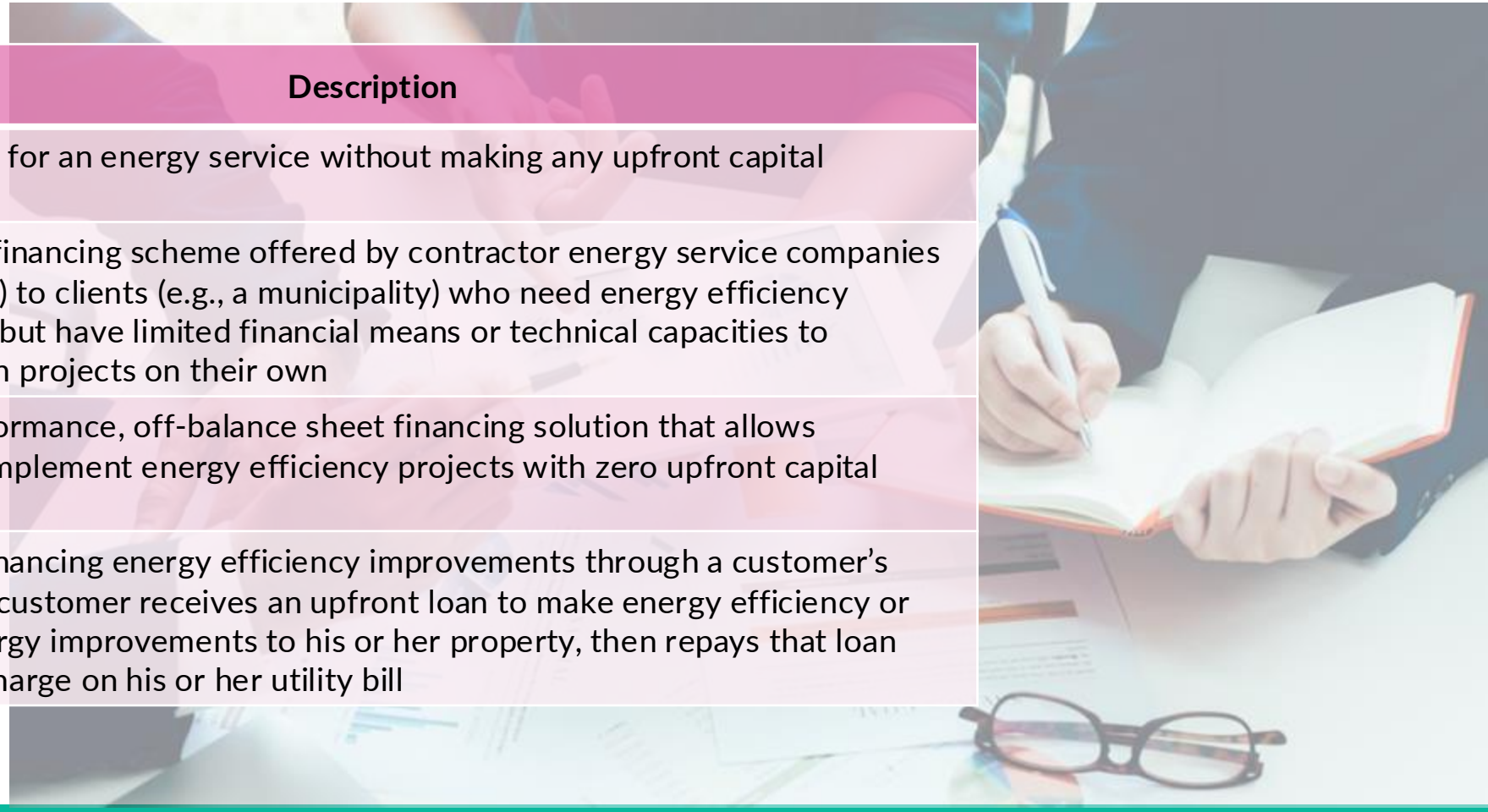
Instrument	Description
Hybrid models of build / purchase / operate / transfer / lease of assets	A project funding model based on a financial agreement between a private contractor and a public organization
Low carbon / efficient equipment capital lease finance	A simple financing structure that allows a customer to use energy efficiency, renewable energy or other generation equipment without purchasing it outright
Low carbon / efficient equipment operating lease finance	A contract that permits the use of an energy efficient asset without transferring the ownership rights of said asset

Source: Purnomo et al., 2024

OTHER INNOVATIVE MODELS

Between customers and solution providers

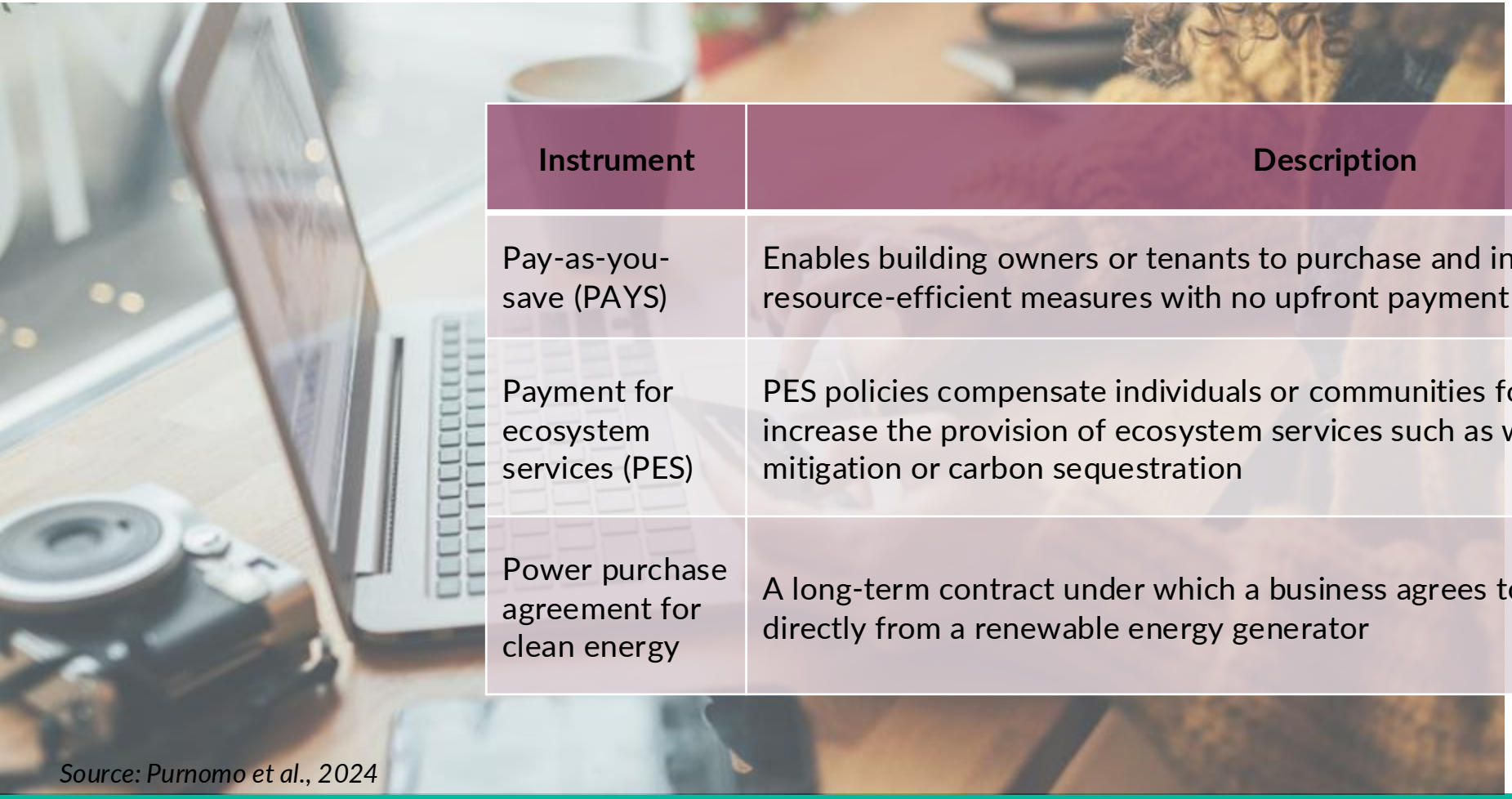
Instrument	Description
As-a-service model	Customers pay for an energy service without making any upfront capital investment
Energy performance contract (EPC) and ESCOs	An innovative financing scheme offered by contractor energy service companies (usually ESCOs) to clients (e.g., a municipality) who need energy efficiency improvements but have limited financial means or technical capacities to implement such projects on their own
Energy service agreement (ESA)	A pay-for-performance, off-balance sheet financing solution that allows customers to implement energy efficiency projects with zero upfront capital expenditure
On-bill financing (OBF) and repayment (OBR)	A method of financing energy efficiency improvements through a customer's utility bill. The customer receives an upfront loan to make energy efficiency or renewable energy improvements to his or her property, then repays that loan through a surcharge on his or her utility bill



Source: Purnomo et al., 2024

OTHER INNOVATIVE MODELS

Between customers and solution providers



Instrument	Description
Pay-as-you-save (PAYS)	Enables building owners or tenants to purchase and install money-saving resource-efficient measures with no upfront payment and no debt obligation
Payment for ecosystem services (PES)	PES policies compensate individuals or communities for undertaking actions that increase the provision of ecosystem services such as water purification, flood mitigation or carbon sequestration
Power purchase agreement for clean energy	A long-term contract under which a business agrees to purchase electricity directly from a renewable energy generator

Source: Purnomo et al., 2024

FISCAL INSTRUMENTS

With government bodies

Instrument	Description
Capital cost subsidy	A subsidy that covers a share of the upfront capital cost of an asset (e.g., a solar water heater)
Carbon credits and markets	A mechanism to reduce greenhouse gas (GHG) emissions by creating a market in which companies can trade in emissions permits
Energy / carbon tax	A type of penalty that businesses must pay for excessive GHG emissions
Feed-in-tariff	A payment made to households or businesses generating their own electricity using methods that do not contribute to the depletion of natural resources, proportional to the amount of power generated
Financial penalty	The obligation to pay a sum of money on conviction of a criminal or administrative offense
Property Assessed Clean Energy (PACE)	PACE initiatives allow local governments to support building owners carry out energy efficiency retrofits or install renewable energy in their properties. This entails conducting special assessments for eligibility and providing upfront funding for the improvement, which is paid back through property tax bills

Source: Purnomo et al., 2024

FISCAL INSTRUMENTS

With government bodies

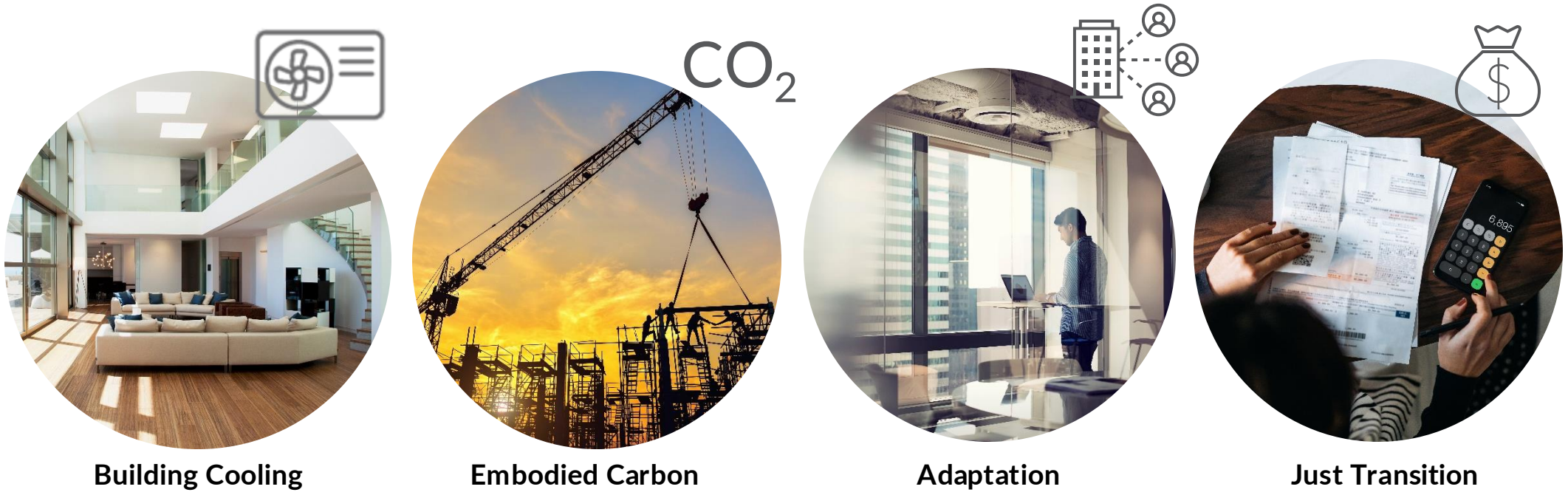
Instrument	Description
Service subsidies	Include payments, tax breaks or other forms of economic support given to individuals and industries. The subsidies are designed to promote infant industries, achieve universal access objectives (health, education and sanitation), and encourage more sustainable patterns of production and consumption (energy and transport), as well as respond to market failures and their potentially undesirable social and developmental consequences
Tax incentives	Include credits, rebates, reductions and exemptions for property owners to install energy-saving equipment and renewable energy systems, and meet green building certification standards. Tax incentives can be based on specific low embodied-carbon criteria such as energy efficiency building codes or green building certification standards
Tax or fee-based land-value capture (LVC)	The value of privately-held land often increases due to public investments in the area. LVC methods usually seek to harness a portion of these unearned rents to help finance public infrastructure or improvement projects. Betterment taxes can be implemented to levy tax on total land value or on the incremental value in the neighborhood of the public investment

Source: Purnomo et al., 2024

FINANCIAL INTERVENTIONS

High-impact thematic focus areas

To make significant impact in the buildings sector, financial instruments should address the following four thematic areas



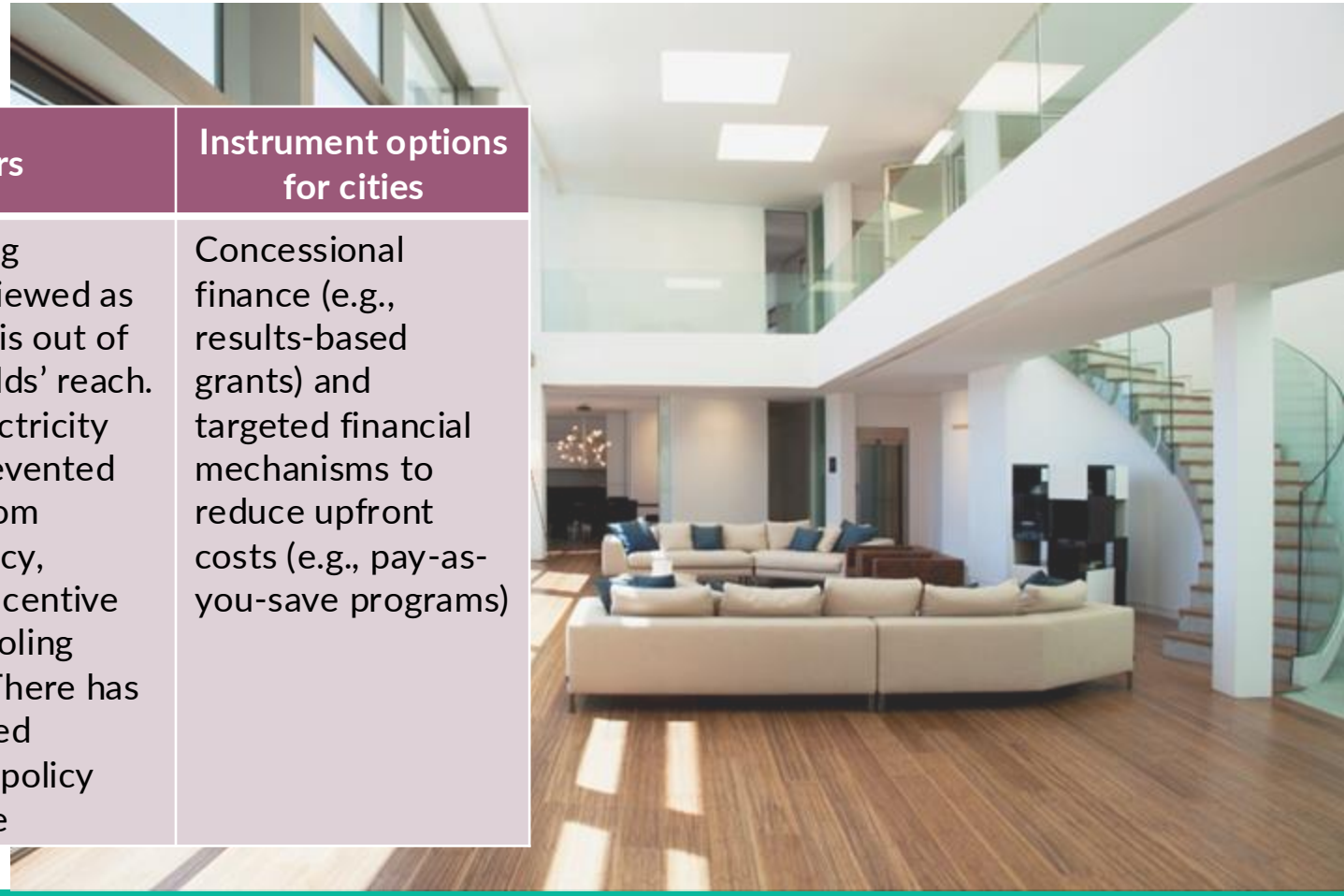
Building Cooling | **Embodied Carbon** | **Adaptation** | **Just Transition**

Source: Micale et al., 2023

FINANCIAL INTERVENTIONS NEEDED

Thematic area: Building cooling

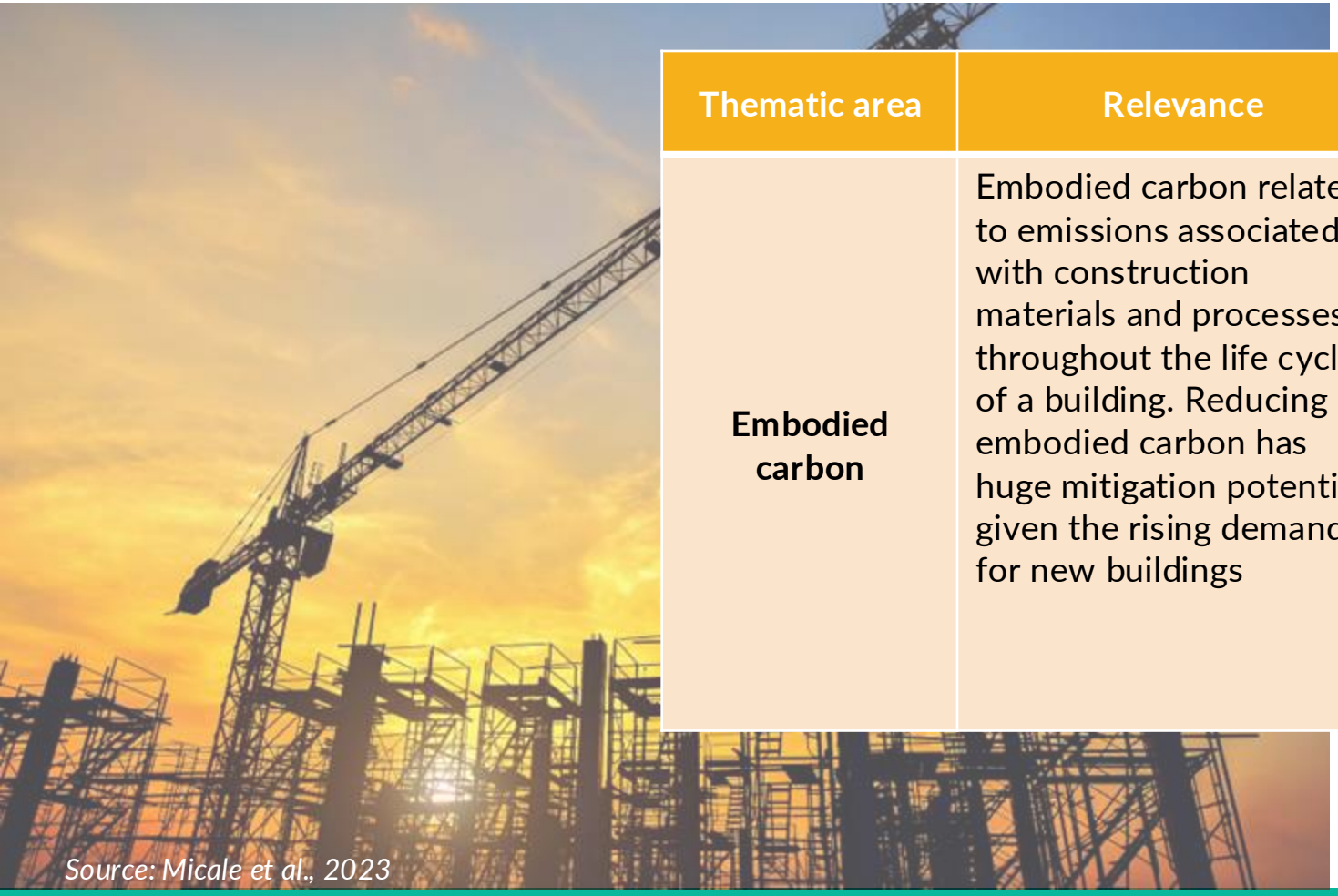
Thematic area	Relevance	Barriers	Instrument options for cities
Building cooling	Building cooling is the fastest-growing energy use in buildings. Meeting cooling energy demand without increasing emissions requires efficient cooling equipment, as well as thermal envelope and passive designs	Efficient cooling equipment is viewed as expensive and is out of many households' reach. Fluctuating electricity prices have prevented cost savings from energy efficiency, becoming an incentive for efficient cooling technologies. There has also been limited regulation and policy support to date	Concessional finance (e.g., results-based grants) and targeted financial mechanisms to reduce upfront costs (e.g., pay-as-you-save programs)



Source: Micale et al., 2023

FINANCIAL INTERVENTIONS NEEDED

Thematic area: Embodied carbon



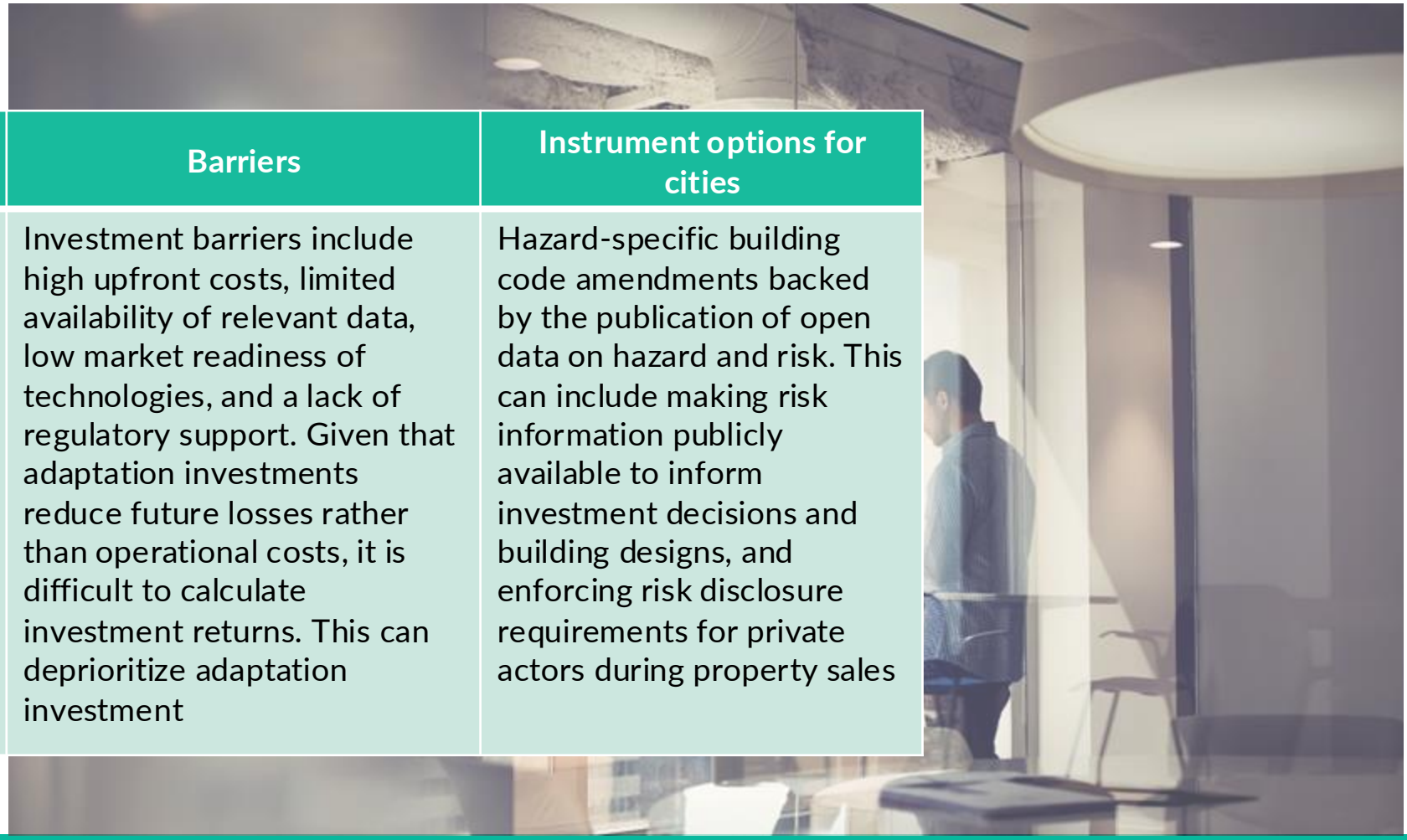
Source: Micale et al., 2023

Thematic area	Relevance	Barriers	Instrument options for cities
Embodied carbon	Embodied carbon relates to emissions associated with construction materials and processes throughout the life cycle of a building. Reducing embodied carbon has huge mitigation potential, given the rising demand for new buildings	Embodied carbon reduction is hindered by a lack of scalable, low carbon technical solutions, lack of awareness and expertise on existing solutions, and lack of performance data and examples of regulatory support for existing solutions	Skills development via workforce training, data benchmarks achieved through life cycle carbon calculation, and effective mandates such as embodied carbon building codes and reporting requirements

FINANCIAL INTERVENTIONS NEEDED

Thematic area: Adaptation for climate resilience

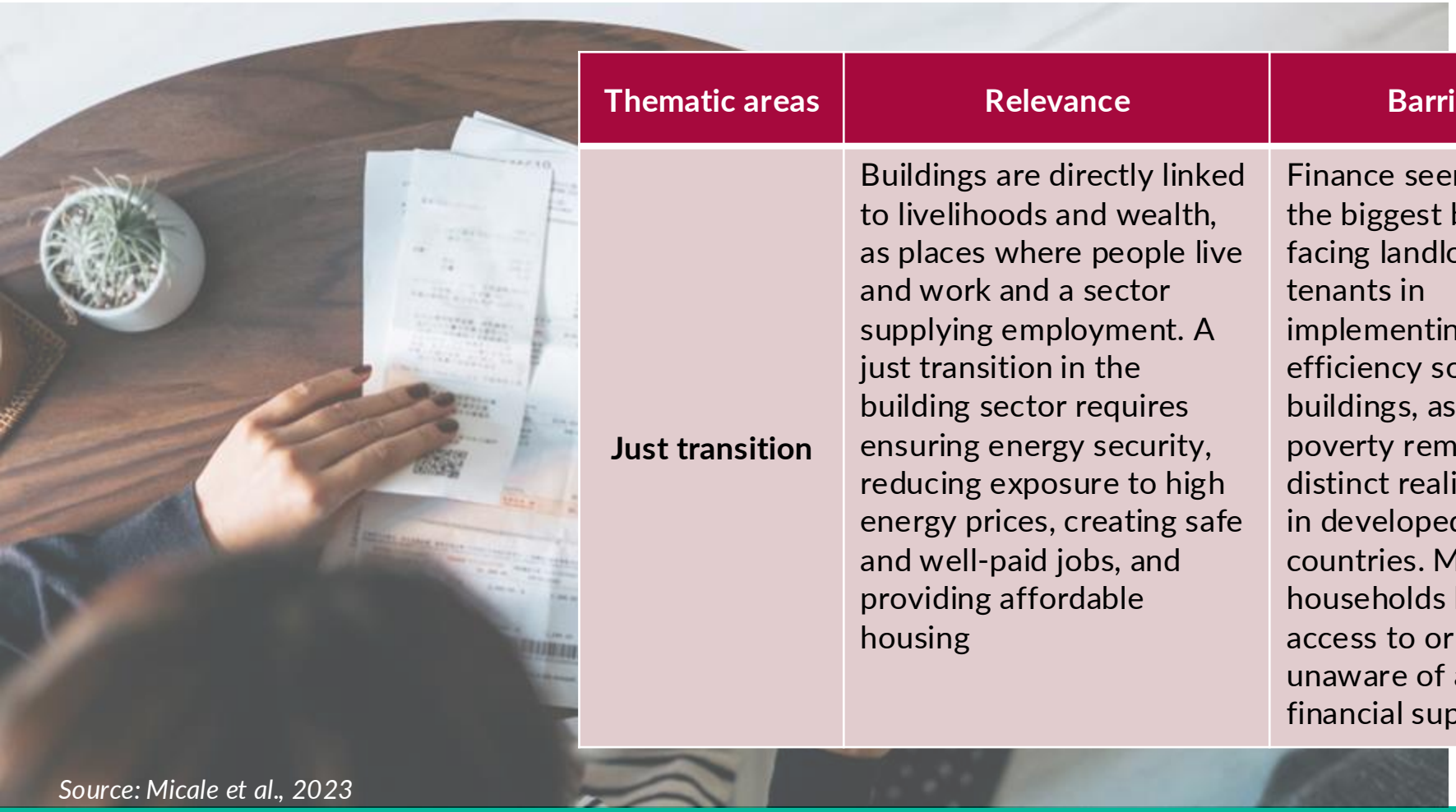
Thematic area	Relevance	Barriers	Instrument options for cities
Adaptation	Adapting buildings to become more climate resilient safeguards people, communities and economies	Investment barriers include high upfront costs, limited availability of relevant data, low market readiness of technologies, and a lack of regulatory support. Given that adaptation investments reduce future losses rather than operational costs, it is difficult to calculate investment returns. This can deprioritize adaptation investment	Hazard-specific building code amendments backed by the publication of open data on hazard and risk. This can include making risk information publicly available to inform investment decisions and building designs, and enforcing risk disclosure requirements for private actors during property sales



Source: Micale et al., 2023

FINANCIAL INTERVENTIONS NEEDED

Thematic area: Just transition ensuring energy security and decent livelihood



Thematic areas	Relevance	Barriers	Instrument options for cities
Just transition	Buildings are directly linked to livelihoods and wealth, as places where people live and work and a sector supplying employment. A just transition in the building sector requires ensuring energy security, reducing exposure to high energy prices, creating safe and well-paid jobs, and providing affordable housing	Finance seems to be the biggest barrier facing landlords and tenants in implementing energy efficiency solutions in buildings, as energy poverty remains a distinct reality, even in developed countries. Many households lack access to or are unaware of affordable financial support	Effectively designed subsidies to make low carbon projects financially viable. Subsidy pilot projects can help identify and test pro-poor solutions and eventually cut costs

Source: Micale et al., 2023

FINANCING LOW CARBON BUILDINGS

Financial barriers and impacted thematic areas

Barrier type	Barrier description	High-impact thematic focus			
		Cooling	Embodied carbon	Adaptation	Just transition
Financial barriers	Lack of access to affordable finance				
	Lack of awareness of funding options				
	Limited supply of dedicated financing instruments				
	Inability to pay for upfront cost				

Source: Micale et al., 2023

FINANCING LOW CARBON BUILDINGS

Investment risk and opportunity barriers and impacted thematic areas

Barrier type	Barrier description	High-impact thematic focus			
		Cooling	Embodied carbon	Adaptation	Just transition
Investment risk and opportunity barriers	Asset class has insufficient project scale				
	High investment costs compared to alternatives	■	■	■	■
	Low or fluctuating energy prices	■			
	Long payback on investment	■		■	■
	Perceived technical performance risk			■	
	Split incentive between landlords and tenants	■			
	Low priority investment			■	■
	Lack of awareness and appropriate information on opportunity		■	■	
	Lack of performance data		■	■	
	High or uncertain maintenance and operation costs				

Source: Micale et al., 2023

FINANCING LOW CARBON BUILDINGS

Market readiness barriers and impacted thematic areas

Barrier type	Barrier description	High-impact thematic focus			
		Cooling	Embodied carbon	Adaptation	Just transition
Market readiness barriers	Limited experience with technical solutions		■	■	
	Lack of expertise and skills		■	■	
	Limited supply of technical products		■	■	

Source: Micale et al., 2023

FINANCING LOW CARBON BUILDINGS

Regulatory barriers and impacted thematic areas

Barrier type	Barrier description	High-impact thematic focus			
		Cooling	Embodied carbon	Adaptation	Just transition
Regulatory barriers	Lack of building regulations support				
	Lack of standard technologies				
	Lack of information on standards and labeling				
	Long processes for application of permits and access to land				
	Social risk and community opposition				

Source: Micale et al., 2023

EU TAXONOMY

European Union's objectives for investments in sustainability projects

- The EU taxonomy for sustainable activities is a classification system that helps investors and companies understand which economic activities are environmentally sustainable
- The EU taxonomy is an element of the EU Renewed Sustainable Finance Strategy that aims to push the financial and industrial sectors toward more investments for climate neutrality in the EU. The objective of the EU taxonomy is to establish a classification framework to facilitate sustainable investment across six environmental objectives
- For investors, this provides the basis to identify which investments are sustainable and can be marketed as such, increasing transparency. Following the enacting of this regulation through the EU and its member states, only investments that comply with technical screening criteria for one of the six environmental objectives, five do-no significant harm standards (see next slide), as well as a set of common minimum social safeguards, can be communicated as sustainable
- Financial institutions are progressively expected to disclose to what extent their portfolios are taxonomy-aligned

Objectives

1. Climate change mitigation
2. Climate change adaptation
3. Sustainable use and protection of water and marine resources
4. Transition to a circular economy
5. Pollution prevention and control
6. Protection and restoration of biodiversity and ecosystems

Source: Programme for Energy Efficiency in Buildings, 2021

EU TAXONOMY

Implications for the building sector

- Technical screening criteria have been developed for economic activities in the building sector
- Other economic activities relevant to the building sector covered by the taxonomy are installation, maintenance and repair of renewable energy technologies, as well as instruments and devices for measuring, regulation and controlling of energy performance of a building. Manufacturing and mining criteria for other economic activities and environmental objectives will equally affect supply chains in the buildings sector
- The five accompanying do-no-significant harm standards concern: (i) minimum water use criteria for installations; (ii) circular economy elements such as re-use, recycling or material recovery of construction waste; (iv) pollution minimization; (v) and biodiversity protection through environmental impact assessments and, in the case of new construction, no construction on arable land, forest land or greenfield land of high biodiversity

Type of economic activity	Technical screening criteria
Construction of new buildings	• Primary energy demand of new construction is at least 10% lower than nearly zero energy building requirements in national measures • Energy performance certified by energy performance certificate • For buildings > 5000m²: life cycle global warming potential calculated, and level of performance is tested post-construction, both disclosed to investors and clients
Renovation of existing buildings	• As applicable in national regulations for major renovations • Reduction of primary energy demand of at least 30%
Acquisition and ownership	• Buildings built before 12/2020: at least Energy Performance Certificate (EPC) Class A, or within top 15% of national building stock expressed in primary energy demand • Buildings built after 12/2020: meet criteria for construction of new buildings • Large non-residential building with HVAC output >290 kW: operated efficiently through energy performance monitoring and assessment

Source: Programme for Energy Efficiency in Buildings, 2021

BLENDED FINANCE

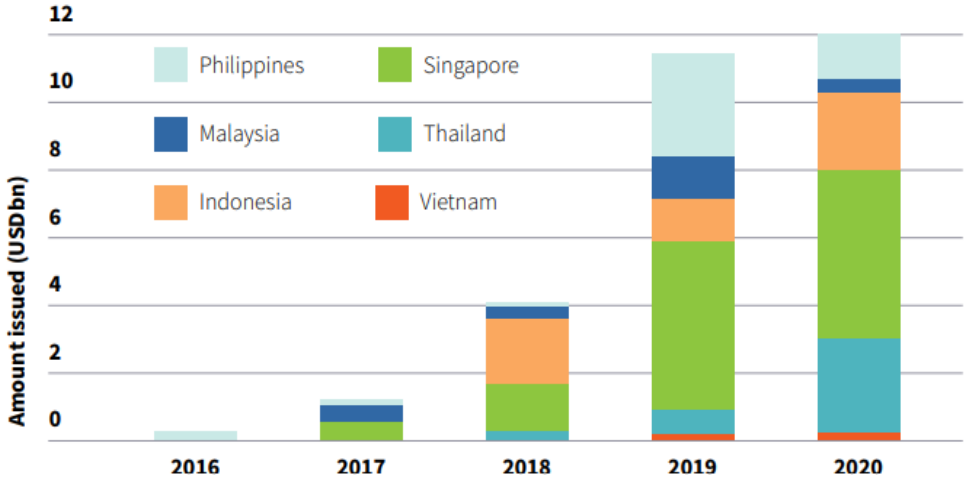
Financial risk mitigation for investors

- Blended finance lets investors choose different risk tolerances while participating in the same project. Often used in real estate transactions, it is proving to be an effective way to get capital to critical, but hard-to-fund projects. The approach can bring together philanthropy, government funding and private sector investors with different risk and return expectations. Those willing to take more risk can act as a capital cushion for investors who need to take less risk but are interested in financing high-impact projects
- Institutional investors (banks, insurers, asset managers, etc.) invest the major portion of the capital for profitable risk adjusted returns
- Concessionary investors (public development assistance and foundations) invest lesser amounts, accepting higher risk of loss or earn below market rate of return
- Finance domain specialists, often sponsored by development banks and private institutions, help match projects with investment capital
- Deserving projects receive finance and apply it to sustainable development programs
- Governments and central banks can work toward easing the access of blended finance to banks, financial institutes, and developers and builders with the specific mandate to provide green finance to low carbon buildings and meet the climate goals of the building sector

GREEN BONDS AND LOANS

The way forward

- Green bonds and loans are debt instruments used to finance projects, assets and activities that support climate change adaptation and mitigation, issued by governments, municipalities, banks and corporates. The green bond label can be applied to any debt format, including for example private placement, securitization, covered bond and sukuk
- Global best practices suggest that bonds and loans be issued in line with Green Bond Principles (GBP), Green Loan Principles (GLP), Climate Bonds Taxonomy and Standard, ASEAN Green Bond Standards, and country-specific guidelines. The key is that the use of proceeds (UoPs) is ring-fenced to only finance green assets, projects and activities
- While there is no single set of global definitions for eligible projects to be funded with green bond and loan proceeds, the Climate Bonds Initiative uses the Climate Bonds Taxonomy, which features eight UoP categories: energy; buildings; transport; water; waste; land use; industry; and information and communications technology



Growth in issuance of sustainability bonds in ASEAN countries, 2016–2020

Indonesia has issued green bonds (sukuks) in the form of:

- Sovereign national bonds
- Municipal bonds

Sources: Nguyet et al. 2021; Purnomo et al., 2024

GREEN MORTGAGES

Case example: Romania

- The Romania Green Building Council (RoGBC) created the SMARTER Finance for Families Program to convince banks to introduce green mortgages
- The program argues that green mortgages can deliver a triple win for developers, banks and home buyers
- A participating developer builds a more expensive green home on the condition that a participating bank will provide a larger loan to a green home buyer to cover the extra cost of building green. The bank books a larger and less risky loan, earning a higher return. The home buyer benefits with a lower monthly ownership cost for a superior home through a combination of preferential mortgage terms and utility savings
- Two participating banks, Raiffeisen Bank and Alpha Bank, offered a green mortgage discount of 75 and 50 basis points, respectively, on the conventional mortgage rate of 5.25%

Image source: https://greenhomes.solutions/news/10-000-green-homes

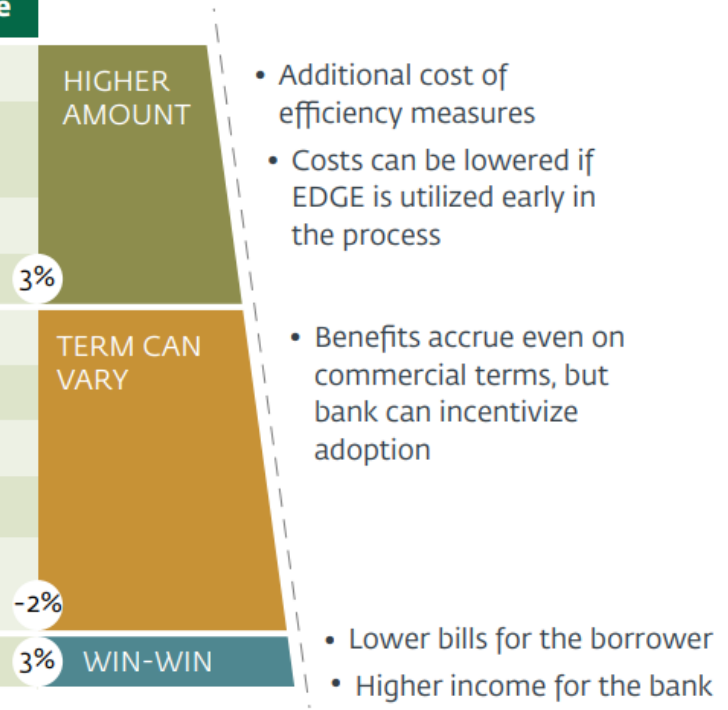
Source: International Finance Corporation, 2019

GREEN MORTGAGES

Comparison with standard mortgages

Green mortgages compare favorably with standard mortgages, despite higher initial costs. The utility savings result in a reduction in the monthly cost of ownership, benefiting both customers and banks – a win-win situation

	Standard building: Standard mortgage	Green building: Green mortgage
Base purchase cost	50,000	50,000
Green measures (3% higher costs)		1,500
20% down payment	(10,000)	(10,300)
Loan amount	40,000	41,200
Rate	11%	11%
Term	20 yrs	20 yrs
Monthly payment	$413	$425
Utility savings (20%)		(20)
Cost of monthly ownership	$413	$405
Bank income (yr 1)	4,371	4,502



Source: International Finance Corporation, 2019

VIETNAM

A glimpse of green credit programs

Proponents	Amount	Intended customers	Participants	Results
State Bank of Vietnam (SBV)	Approximately USD100m	SMEs with green projects	Vietcombank, BIDV, Agribank and Sacombank	• 26 projects: renewable energy, waste management and organic agriculture • The interest rates applicable to SMEs is 1%–3% lower than market interest rates • Banks participating in the program are refinanced from SBV at interest rates 1% lower than usual
Agribank and Vietnam Development Bank (VDB)	60% of the required capital (about USD18m)	Solar Power Plant TTC Phong Dien in Hue province	Agribank and Vietnam Development Bank	• Construction was from 2017 to 2018 • Agribank Thua Thien-Hue and Agribank Gia Lai branches will finance 30% of the total investment, while VDB Thua Thien-Hue and VDB Quang Tri will cover the rest
Vietcombank and Japan International Cooperation Bank (JICB)	USD200m	Solar and wind power projects in Vietnam	Vietcombank and Japan international Cooperation Bank	Limited results so far, as the cooperation agreement between Vietcombank and JICB was signed in May 2019
Agribank and Central Power Corporation (EVNCPC)	VND735bn	Central Power Solar Project in Khanh Hoa province	Agribank	The power plant was completed and put into operation in late May 2019

The focus is on small and medium-sized enterprises (SMEs), and solar and wind power plants. **The buildings sector is yet to attract any significant green funds**

Source: Davidson et al., 2020

INDONESIA

Case example: Green and affordable housing program

- Supported by the International Finance Corporation (IFC), the Ministry of Housing and Public Works aims to build 10,000 new houses with green certification across Sumatra, Java and Sulawesi (Indonesia's most populous islands) by 2024. This is part of IFC's Excellence in Design for Greater Efficiencies (EDGE) initiative, focusing on renewable energy and waste management for buildings
- The initiative provides grants for assessment based on climatic conditions, usage patterns, technology, and typical buildings in a given area to demonstrate the amount of energy and water savings achievable by implementing sustainable technologies
- The grants fund the assessment costs to calculate the savings and financing needs for green buildings. However, there is room to improve the deployment of grant-based instruments. First, data accuracy in relation to results-based grants remains a challenge, especially in generating evidence-based energy performance. Second, there is a lack of awareness of available grant facilities for green buildings, and a lack of understanding of the best options to use such grants

Source: Purnomo et al., 2024

Image source: https://ruangkantorku.com/ruang-kantor/altira-office-tower-sunter-jakarta-utara/

INDONESIA

Case example: Intervention by Central Bank

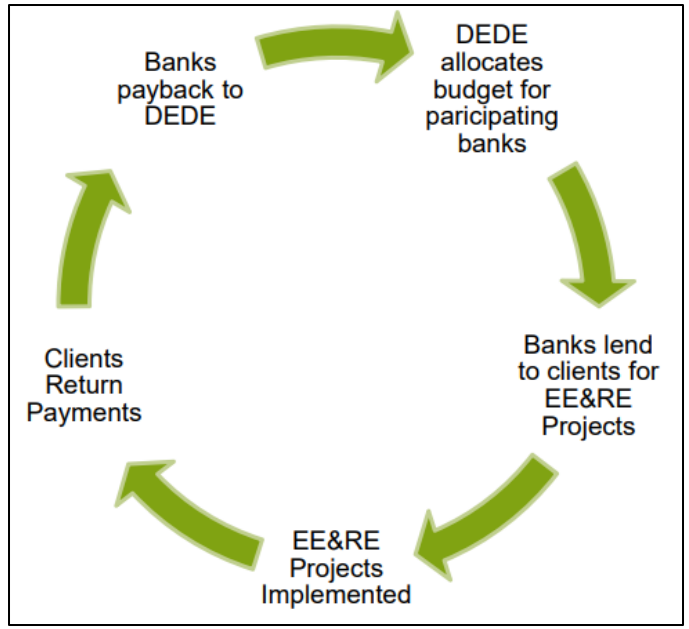
- The Indonesian Financial Services Authority (OJK) and the Central Bank of Indonesia have created a sustainable finance roadmap aimed at increasing green finance portfolios, including for buildings. This is designed to support banks in financing green buildings in their portfolios and also greening their own operations, including their office buildings. This regulation can support the development of the green building sector in major cities like Jakarta, where large commercial banks have started applying green standards in their office buildings
- The OJK Sustainable Finance Roadmap, adopted in 2021, contains guidance and policy directions for sustainable finance development in Indonesia, and is a realization of cooperation between OJK and the government, particularly the Ministry of Environment and Forestry. The objectives are to:
  - Ensure financial institutions operate sustainably, by obligating them to report emissions reductions pertaining to energy consumption as part of their annual mandatory sustainability reporting. This mandate, enforced under POJK 51/2017 has triggered major banks to invest in green building retrofit projects and invest in energy efficiency
  - Encourage capital market participants to raise funds through green-labeled instruments, regulated under POJK 60/2017. The OJK includes green buildings as among the projects eligible to access funds from green bond issuance. The OJK also provides clear regulations for local governments to issue municipal bonds

Source: Purnomo et al., 2024

THAILAND

Case example: Energy efficiency (EE) revolving fund for banks

- Launched in 2003, the general principle of the EE Revolving Fund (EERF) is that the revenue generated via repaid loans is made available for issuing new loans – hence the term revolving. This fund structure is sustainable in that it ensures a consistent inflow and outflow of monies for funding EE measures
- The EERF started as a partnership between the government and six participating banks (PBs), which later expanded to 11 banks. The EERF is managed by the Planning Division of the Department of Alternative Energy Development and Efficiency (DEDE)
- Initially, the EERF provided PBs with zero interest credit lines to jumpstart projects. When financing higher-volume projects, PBs used their own funds and mixed accordingly. The interest was subsequently set at 0.5% to cover administrative costs. Interest for on-lending to borrowers was set at a ceiling of 4% per annum. Although many of the PB borrowers requested higher amounts, the maximum loan amount was THB50 million (~USD1.4 million) per project in order to fund as many medium-sized projects as possible
- During 2003–2011, the EERF financed 294 projects totaling THB15,959 million (with THB7,232 million from the EERF and THB8,727 million from commercial banks). The impact assessment indicated reduction in oil imports of 320 KTOE/year and GHG emissions reduction of 0.98 million tCO_2eq.



Source: Grüning, 2012

POLICY INTERVENTIONS

Case example: Green building code implementation in Columbia

- In 2015, the Colombian government enacted the first mandatory green building code in Latin America. This includes minimum requirements for the construction of new residential and commercial buildings aimed at ensuring lower energy and resource consumption than conventional buildings. By establishing clear direction for public policy, the government raised awareness in the industry and successfully unleashed a wave of private sector investment in green buildings totaling USD9 billion to date, according to IFC estimates
- Policies included tax incentives for green technologies and certified green projects. This enabling environment gave banks confidence to launch green construction finance and green mortgages. In 2016, Bancolombia became the first bank in Latin America to finance green buildings by raising USD400 million in three bond issuances. In 2017, the Colombian Chamber of Construction (CAMACOL) started an aggressive educational program with its members to promote EDGE certification. By 2021, five banks were offering green building finance products—mainly green mortgages: Bancolombia, Davivienda, BBVA, Banco Bogotá and Caja Social
- In 2021, about 20% of Colombian new construction was certified as green, from virtually no green buildings in 2017. CAMACOL is now pushing members toward zero-carbon construction. Banks meanwhile are increasing their product offerings for green construction: BBVA, for instance, plans to launch preferential financing for EDGE Advanced buildings (higher resource efficiency)

Source: International Finance Corporation, 2023

GREEN CONSTRUCTION FINANCE

Case example: Concessional finance in Costa Rica

- In 2016, Costa Rican bank, Banco Promerica, obtained a USD30 million loan from the Dutch development bank, FMO, to launch a green construction finance and green mortgage program. Before the bank could launch a green mortgage program, it had to build a sufficient pipeline of certified green properties
- To incentivize developers to build green, the bank offered a discount on green construction finance. It charged 8.75% (instead of 9.25%), offered a 0.75% front-end fee (instead of 1%), and provided a four-year term (instead of three years). Depending on the project, the discount on the front-end fee covered most of the cost of the upfront requirement of green certification
- Promerica succeeded in building a sufficient supply of green properties to start offering green mortgages. It offered qualifying home buyers a 30-year fixed rate that was slightly higher than the market rate for 30-year variable-rate mortgages in the country. It aims to expand its mortgage portfolio, which is currently 10% of its business. To finance this expansion, the bank plans to securitize its green mortgage portfolio once it reaches USD20 million to USD30 million in size

Source: International Finance Corporation, 2019

LOW CARBON BUILDING FINANCING

Barriers

Financial Barriers

- Lack of access to affordable finance
- Lack of awareness of funding options
- Limited supply of dedicated financing instruments
- Inability to pay for upfront costs

Regulatory Barriers

- Lack of building regulation support
- Lack of technology standards
- Long processes for application of permits and access to land
- Social risk and community opposition

Market Barriers

- Limited experience with technical solutions
- Lack of expertise and skills
- Limited technical product supply

Investment Risk and Opportunity Barriers

- Asset class has insufficient project scale
- Higher investment costs compared to alternatives
- Long payback on investment
- Perceived technical performance risk
- Split incentive between landlords and tenants
- Low priority investment
- Lack of awareness and appropriate information on opportunity
- Lack of performance data
- High or uncertain maintenance and operation costs

Source: Purnomo et al., 2024

LOW CARBON BUILDING FINANCING

Opportunities for innovation in government policies

- Low carbon buildings are expected to be 5%–10% more expensive than conventional buildings
- The three main stakeholders involved in monetary transactions in the building sector are: (i) developers and builders; (ii) banks and financial institutes; and (iii) buyers. Banks and financial institutes are unlikely to have any issues in giving a 5%–10% higher loans to credit worthy developers and builders for low carbon buildings. However, the developers and builders need to be convinced that buyers will pay a higher price for the green features. There is a need for well-publicized demonstration projects in different parts of the country of low carbon commercial and residential buildings that can convince all stakeholders of the benefits of low carbon buildings. A compendium of recommended measures to make buildings compliant should be made available to developers, builders and architects
- Governments should consider policy initiatives to enable urban local bodies (ULBs) to provide higher 'floor area ratio' (FAR) (permissible total built-up area divided by the total area of the plot) as an incentive to developers and builders to compensate for the 5%–10% higher investment. This may enable builders to sell their low carbon buildings at the same price as conventional buildings. Higher FAR incentive can be very transformative, motivating more developers and builders to move away from constructing conventional buildings to low carbon buildings. Higher FAR will also enable ULBs to generate more revenue from building owners through property taxes
- Governments can reduce property registration duty for low carbon buildings as an incentive for property buyers. Since property registration duties constitute a significant portion of the total property cost, offering a discount can serve as a powerful motivator for property buyers to shift to low carbon buildings

LOW CARBON BUILDING FINANCING

Opportunities for policy interventions by central banks and government

- Unless green loans are available to developers, builders and property buyers as a standard product through normal banking channels, it is difficult to envisage proliferation of low carbon buildings on the scale required to achieve climate goals. Real scale-up may happen if all major banks offer concessional green loans and mortgages as standard off-the-shelf products to builders and developers. Access to blended finance can help ensure the competitiveness of these innovative loan and mortgage products
- Central banks should treat energy efficient green buildings as a priority sector for concessional loans, in the same way as it treats micro, small and medium-sized enterprises. A directive from central banks to commercial banks can help evolve options for green loans and mortgages in all major banks. This can also make banks active marketing agents for promoting energy efficient green buildings with developers and builders being presented with both options when they approach banks for credits and loans
- Central banks should explore the possibility of government-sponsored Super ESCOs offering a package along with loans from banks and financial institutes to cover additional investment of 5%–10% in low carbon buildings. The empaneled energy auditors (under the Super ESCO) can provide technical support and confirm the implementation of recommended measures for low carbon buildings
- Governments must work toward strict enforcement of energy efficiency and green building codes for all new constructions and promote retrofits in existing buildings, using carrot and stick policies with incentives and disincentives. Urban local bodies (ULBs) should make energy efficiency and green building features mandatory before approval of construction plans, and competent juries will have to be appointed in ULBs

Thank you!

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