Economic and Social Commission for Western Asia

Toolkit for Energy Efficiency Financing Instruments for Buildings in the Arab Region

Brochure

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VISION

ESCWA, an innovative catalyst for a stable, just and flourishing Arab region

MISSION

Committed to the 2030 Agenda, ESCWA's passionate team produces innovative knowledge, fosters regional consensus and delivers transformational policy advice. Together, we work for a sustainable future for all.

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References have, wherever possible, been verified.

Symbols of the United Nations documents are composed of capital letters combined with figures. Mention of such a symbol indicates a reference to a United Nations document.

The opinions expressed in this technical material are those of the authors and do not necessarily reflect the views of the Secretariat of the United Nations.

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AUTHORSHIP

The report was developed by the Energy Section in the Climate Change and Natural Sustainability Cluster of ESCWA. Lead author was Dr. Steven Fawkes, Managing Partner at EnergyPro Ltd. and ESCWA consultant, under the supervision of Ms. Radia Sedaoui, Chief Energy Section, with contributions from Mr. Mongi Bida, First Economic Affairs Officer, and Mr. Mohamed Zied Gannar, Economic Affairs Officer at the Energy Section of the Climate Change and Natural Sustainability Cluster, ESCWA. Support was also provided by Mr. Mohamed Alsayed, Manager, and Mr. Hussain Mugaibel, Global Lead Energy Specialist, at the Public Private Partnership Division and Economic Infrastructure Division respectively, at IsDB.

REVIEW AND CONSULTATION

The public consultation and peer review processes were coordinated by ESCWA and included the expert workshop on "Financing the Upscaling of Building Energy Efficiency Programmes for Climate Change Mitigation and Sustainable Development in the Arab Region", organized by ESCWA in Beirut in December 2020. Substantive comments and inputs were provided by international experts from regional and international organizations as follows: Mr. Scott Foster, Director of Sustainable Energy Division, Economic Commission for Europe (ECE); Mr. Ashok Sarkar, Senior Energy Specialist, Energy and Extractives Global Practice, The World Bank; Ms. Helen Naser, Advisor, Programme for Energy Efficiency in Buildings (PEEB), Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ); Mr. Nicholas Howarth, Research Fellow III, Climate and Environment Programme, King Abdullah Petroleum Studies and Research Center (KAPSARC); Mr. Rafik Missaoui, Sustainable Energy Economist, Chief Executive Officer, Alcor; and Ms. Kawther Lihidheb, Senior Energy Efficiency Specialist, ECONOLER.

THE CASE FOR ENERGY EFFICIENCY

Improving energy efficiency, particularly within the building sector, is recognized as a major contributor to climate change mitigation and an area where current efforts must be increased. Improving energy efficiency is in line with Sustainable Development Goal (SDG) 7, "Ensure access to affordable, reliable, sustainable and modern energy for all", and in particular target 7.3, "By 2030, double the global rate of improvement in energy efficiency", but also target 7.1, "By 2030, ensure universal access to affordable, reliable and modern energy services".

Policy instruments can encourage the demand for energy efficiency projects and programmes that can utilize the various financing mechanisms that are available, including purpose-designed energy efficiency financial instruments, but the specific problem of bridging the gap between potential projects and fully developed, bankable projects must be addressed. Failure to do so risks creating financing instruments with insufficient deal flow for the available financing.

Scaling up energy efficiency in the building sector will free up energy resources that can be used to extend services to other potential end users.

Scaling up energy efficiency in the residential sector can enable access to additional energy services by vulnerable segments of society and reduce the risk of energy vulnerability.

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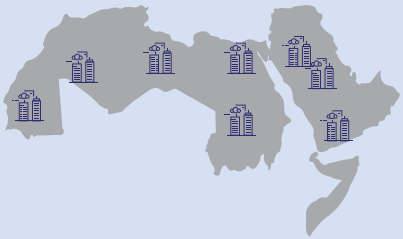
1 SCALING UP BUILDING ENERGY EFFICIENCY FINANCING IN THE ARAB REGION

Over the last few years, energy markets have opened up for private-sector investment, and fossil fuel and electricity subsidies have been reduced across the region, leading to increased costs for consumers and industry and improving the case for energy efficiency.

The Arab region needs to reach a regional aggregate average annual improvement of 3.4 per cent compound annual growth rate (CAGR) in order to meet the global 2030 target, requiring significant increases in the level of investment going into energy efficiency.

1,450 TWh
by 2030



2,000 TWh
by 2050

If current trends remain unchanged, buildings in the Arab region would consume 1,450 terawatthours (TWh) by 2030, a doubling compared to the 2005 consumption, and reach 2,000 TWh by 2050, a doubling of the 2015 consumption.

Financing energy efficiency generally, has a number of barriers. These are exacerbated by lack of capacity in the following three areas: energy consumers' ability to understand and make decisions about energy efficiency upgrades; the supply chain needed to design, develop and deliver building energy efficiency projects at scale; and the ability of financial institutions to originate, value and risk-assess energy efficiency projects.

There are a number of regional specific barriers such as the need to address energy vulnerability. These barriers, including the variations between subregions, need to be addressed in the design of any energy efficiency financing instrument for the region.

2

ENERGY EFFICIENCY POLICY IMPLEMENTATION INSTRUMENTS FOR THE ARAB REGION AND THE ROLE OF FINANCING INSTRUMENTS

ENERGY EFFICIENCY POLICY INSTRUMENTS FOR THE ARAB REGION

Table 1. Overview of energy efficiency policy instruments in the Arab region

INSTRUMENT	PRESENCE IN THE REGION	SIMPLICITY OF IMPLEMENTATION	TRANSFERABILITY AND REPLICABILITY	CAPACITY OF MARKET TRANSFORMATION
Auction systems for EE	Practically non-existent	Some barriers	Rather easily transferable	Large
Mandatory EE targets	Practically non-existent	Rather easy to put in place	Easily transferable	Large
Utility-managed EE programmes	Practically non-existent	Rather complex to put in place	Some barriers	Large
EE network with voluntary goals	Only few examples	Rather easy to put in place	Rather easily transferable	Medium
DSM electricity pricing or dynamic electricity prices	Only few examples	Rather complex to put in place	Rather context-specific circumstances	Large
Mechanism for accelerating replacement of the stock of energy using equipment and appliances	Only few examples	Some barriers	Some barriers	Large
Energy savings insurance mechanism of an energy performance contract	Practically non-existent	Some barriers	Rather easily transferable	Medium
Voluntary agreement	In some countries	Some barriers	Rather easily transferable	Medium
EE tax based instrument	Practically non-existent	Some barriers	Rather context-specific circumstances	Large
Super ESCO	In some countries	Some barriers	Rather easily transferable	Large

Source: GIZ, 2020. Innovative Energy Efficiency Instruments for the MENA Region.

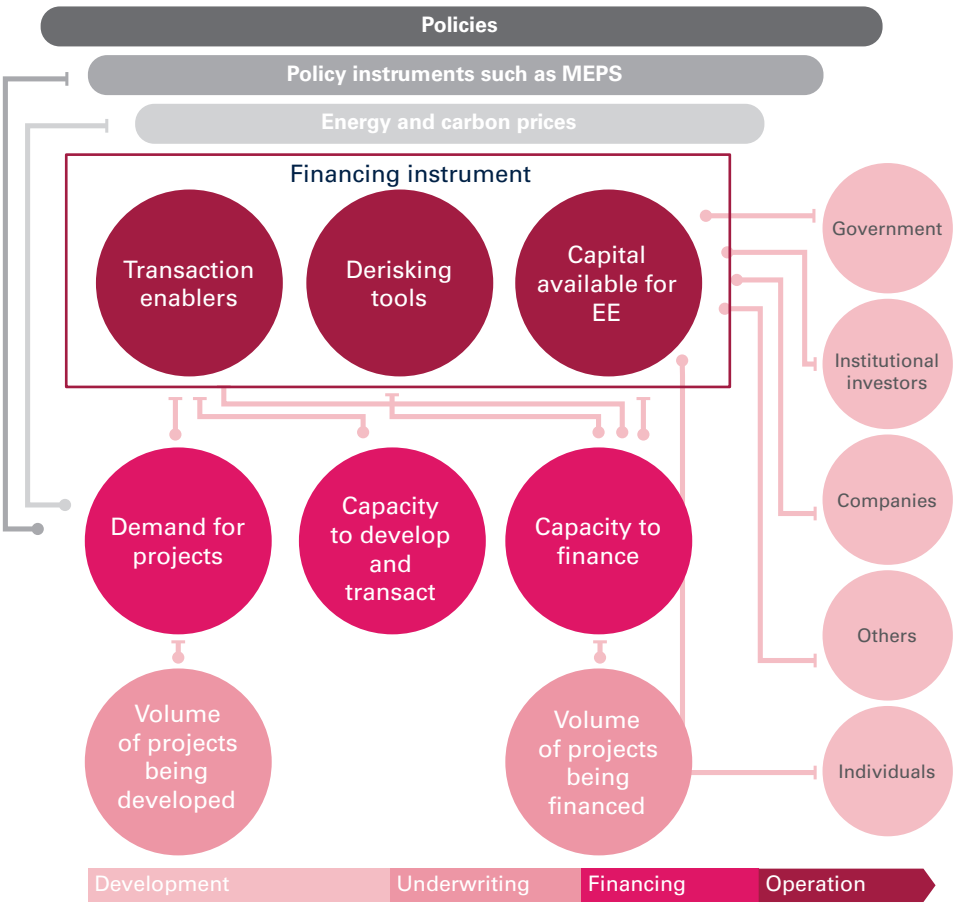
3

THE DESIGN OF ENERGY EFFICIENCY FINANCING INSTRUMENTS

A. THE IMPORTANCE OF A SYSTEMS VIEW

In order to increase the flow of capital into energy efficiency it is necessary to increase the following: (a) the volume of projects being developed; (b) the capacity to develop, transact and finance projects; and (c) the volume of capital made available for energy efficiency. The existence of derisking tools can build the capacity to finance and help increase the capital available for energy efficiency.

Figure 1. A systems view of the drivers needed to upscale energy efficiency

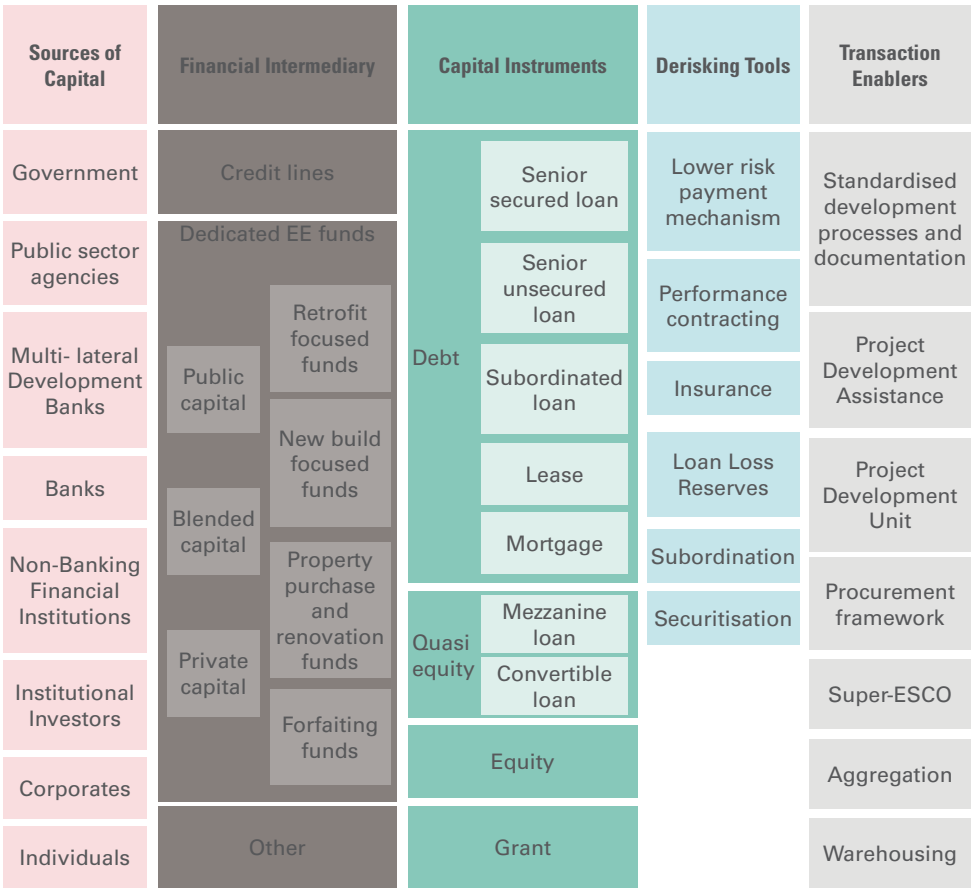


Source: Compiled by author, ESCWA.

B. THE FIVE COMPONENTS OF ENERGY EFFICIENCY FINANCING INSTRUMENTS (OECD)

The public-private partnership or blended capital model, when properly designed, holds significant promise for helping to increase investment into energy efficiency, particularly for private-sector institutional investors that lack experience and confidence in the asset class.

Figure 2. The components of financing instruments



Source: Adapted from OECD, 2015. Mapping Channels to Mobilise Institutional Investment in Sustainable Energy: Green Finance and Investment. OECD Publishing, Paris.

1. Types of financial intermediaries: funds and credit lines

Credit lines - Credit lines for energy efficiency lending are backed by credit lines from multilateral banks. As markets evolve, local banks need to be encouraged to establish dedicated energy efficiency products.

Funds - Funds can be debt funds, equity funds or mixed debt-and-equity funds. Most energy efficiency funds are primarily debt funds. Each fund will have a specific investment focus or purpose written into its governance structure.

2. Types of capital (capital instruments)

Table 2. Types of capital

TYPES OF CAPITAL	DESCRIPTION
DEBT	Borrowers commit to pay to the lender the principal and interest (cost of funding) following an agreed schedule. Borrowers use assets as collateral as reassurance to the lender. Debt instruments include loans, mortgages, leasing, convertible loans, and bonds. Loans can use blended capital, namely, from subsidized loans and private capital to reduce borrower costs.
EQUITY	Equity financing means taking an ownership stake in a company or project in return for a share of the profits of the company/project and the investment stake appreciation. Quasi-equity instruments have debt-like properties and equity-type functionality. It is less expensive than straight equity but can provide virtually the same level of value as a straight equity investment. Specifically, quasi-equity financing can be in the form of mezzanine debt, venture debt, convertible debt, structured equity, and preferred equity.
GRANTS	Grants are non-repayable contributions (cash or in-kind) bestowed by a granter (often a Government agency, corporation, foundation, or trust) to a recipient for a specified purpose. Grants are usually conditional upon specific objectives on use or benefit and might require a proportional contribution by the recipient or other grantors.

Source: OECD, 2015.

3. Derisking (risk mitigation) tools

Energy efficiency projects, like any other project, have real risks, and these risks need to be recognized and assessed as part of investment decisions. The problems of real and perceived risk can be addressed by utilizing a number of risk mitigators, or derisking tools.

(a) Loan loss reserve (LLR)

LLRs set aside a proportion of the capital to cover potential losses and help reduce repayment risk. If a borrower defaults, the lender is repaid using the reserve fund.

(b) Loan guarantees

Loan guarantees (full or partial) are provided either by Government agencies or specialised guarantee institutions.

(c) Debt service reserve fund (DSRF)

A DSRF sets aside a limited pool of funds from which lenders or investors can recover overdue debt service payments. In the event that overdue debt service payments lead to a customer default, the lender or investor can keep funds it has received from the DSRF to offset the loss.

(d) Subordinated capital

Subordinated capital takes on the majority of customer default risk and acts as a credit enhancement for senior capital. Subordinated capital is invested in loans or pools of loans and typically earns interest from the performing loans.

Table 3. Key credit enhancement considerations

CREDIT ENHANCEMENT TOOL	LIKELIHOOD OF DEPLETION OVER TIME	STRENGTH OF PROTECTION TO LENDERS	COMMON USES
LOAN LOSS RESERVE (LLR)	High; defaults reduce LLR size	Low; lenders share each loss, coverage capped at a percentage of loan pool	Small loans, partnerships with individual lenders
LOAN GUARANTEE	N/A; guarantees often do not have a maximum amount	High; lenders shielded from all exposure to losses	Large pools of loans, very flexible
DEBT SERVICE RESERVE FUND (DRSF)	High; defaults reduce DRSF size	Medium; lenders protected from cash flow uncertainty and 100 per cent of individual losses, but coverage capped	Large loans for which timing of payment receipt is essential
SUBORDINATED CAPITAL	Low; interest earned can offset defaults	Medium; lenders covered from all individual losses, but coverage capped	Large pools of small loans or large loans

Source: State and Local Energy Efficiency Action Network, 2014.

4. Other derisking tools

(a) Insurance

There are various types of insurance, including project performance insurance which mitigates some of the technical performance risks, but it can be expensive and may not be available at all in some markets.

(b) The use of performance contracting through ESCOs and Super ESCOs, using energy performance contracts to guarantee results

The use of ESCOs and EPCs can reduce the financial risk of projects for both the customer and the provider of finance.

(c) Securitization

Illiquid or small-scale assets, such as cash flows from a portfolio of energy efficiency loans, are transformed into a standardized and tradable asset. Securitization requires sufficient asset quality and scale.

(d) Use of lower-risk repayment mechanisms

In property assessed clean energy (PACE), repayments of loans for energy efficiency improvements are added to property taxes over a long term. In on-bill finance (OBF), periodic payments to repay a loan used to fund an energy efficiency project are added to the beneficiary's utility bill. OBF can be lower risk as consumers have a higher tendency to pay their electricity bills than other debts due to the threat of disconnection.

5. Transaction enablers

(a) Project development assistance

PDA facilities are specific funds set aside, either as risk capital or grants, that can be used by project developers and/or hosts to develop projects to the point at which they can be financed. Some PDA programmes notably require the achievement of a certain investment leverage ratio.

(b) Project development units

PDUs are specialized teams established to assist project hosts to develop projects to the point at which they can be financed and are often supported by PDA funds.

(c) Procurement frameworks

A procurement framework is a standardized way of procuring project services such as engineering, but also equipment and project delivery services.

(d) Super energy service companies

As part of the multiple functions of Super ESCOs, they are transaction enablers as they act as project developers, usually for portfolios of projects, and can connect projects to finance.

(e) Aggregation or bundling

Aggregating multiple projects helps reduce transaction costs and limits risk exposure as the financier is exposed to the risk of a portfolio of projects rather than a single project.

(f) Warehousing

Warehousing is the process of pooling projects within one vehicle in order to reach a size where the aggregated asset becomes attractive either for an outright sale to large investors or securitization through bond issuance.

(g) Standardization tools

In order to scale investment in any asset class, the finance industry requires standardization. Energy efficiency is not yet a recognizable asset class, partly because it is very heterogeneous and far from standardized.

(h) Grants and beneficial payment terms or costs

The provision of grants or beneficial payment terms to the customer can also be considered transaction enabler as they encourage customers to transact.

(i) Results-based financing

Programmes that reward the delivery of one or more outputs or outcomes by one or more incentives, financial or otherwise, upon verification that the agreed-upon result has actually been delivered.

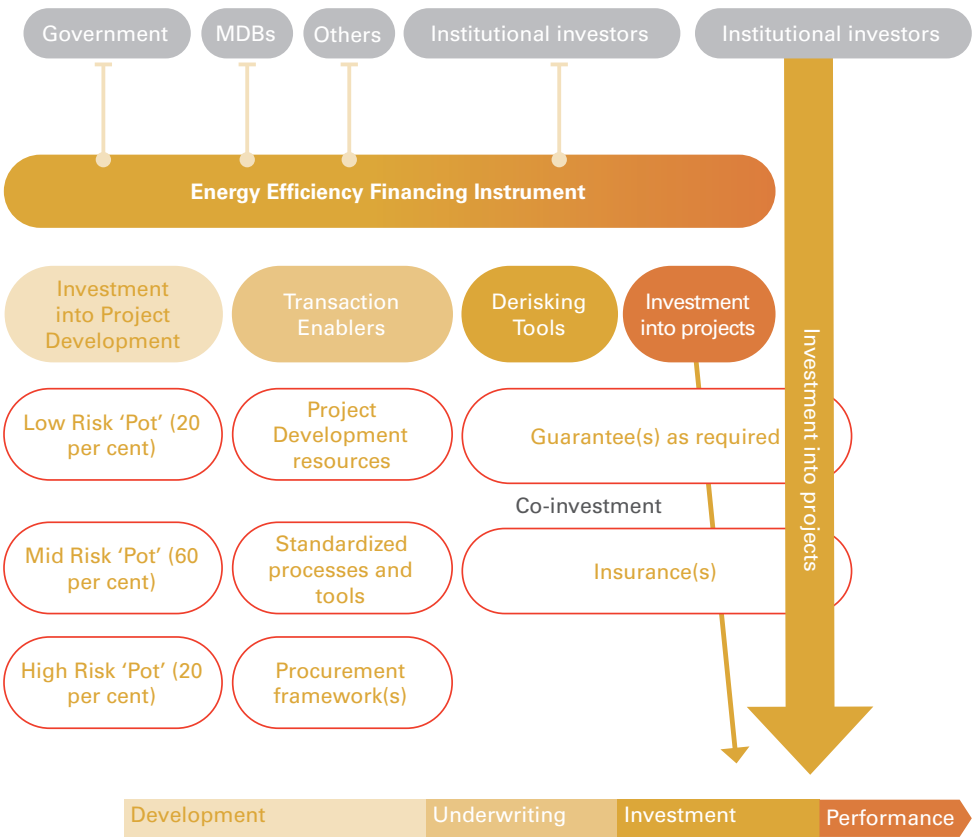
4 PROPOSED INSTRUMENTS TO DEVELOP SMART MARKET SOLUTIONS

A. ENERGY EFFICIENCY FUND DESIGN

The overall aim of the fund should be to develop projects to the point at which they are bankable and secure funding for them.

The available development capital can be split into different risk pots which allows investment into the development stage of projects of varying risk profiles.

Figure 3. Generic design for an energy efficiency financing instrument



Progress of projects from development through to investment and implementation

1. Regional and local variation to the generic model

Table 4. The effect of regional and local conditions on the design of financing instruments

COMPONENT	FACTORS TO CONSIDER
ROLE OF PUBLIC SECTOR AS PROVIDER OF CAPITAL AND CATALYST	Degree of development of financial sector Existence of sustainable investing regulations
DEGREE TO WHICH PUBLIC CAPITAL IS NEEDED FOR PROJECT FINANCING (AS OPPOSED TO DEVELOPMENT)	Experience in energy efficiency financing Availability of project-type finance Access to financial services (particularly in residential sector in least developed countries)
USE OF DERISKING TOOLS	Experience in energy efficiency financing Real and perceived risks of energy efficiency projects Sector focus (which affects ability to repay)
USE OF TRANSACTION ENABLERS	Level of demand for energy efficiency projects Capacity to develop energy efficiency projects

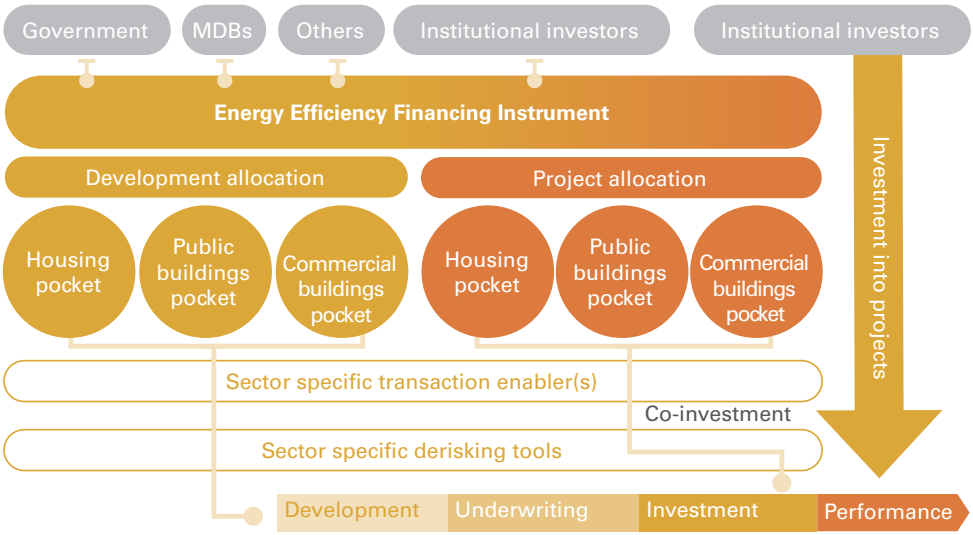
Table 5. Other factors in the design of financing instruments

PARAMETER	FACTORS TO CONSIDER
FOCUS OF INVESTMENT (SECTOR)	Local needs Identification of the biggest impact
INVESTMENT SCOPE	• Local needs • In least developed countries, there is a need to integrate energy efficiency with energy supply to increase energy access • Integration with high-performance buildings and green buildings needs to be considered • Business models such as energy as a service or energy efficiency as a service • The instrument's investment rules must be appropriately designed

2. An instrument covering multiple sectors

There are significant differences between residential, public and commercial buildings. These differences strongly suggest that a sectoral approach is optimum.

Figure 4. Design of an energy efficiency fund with sector-specific pockets

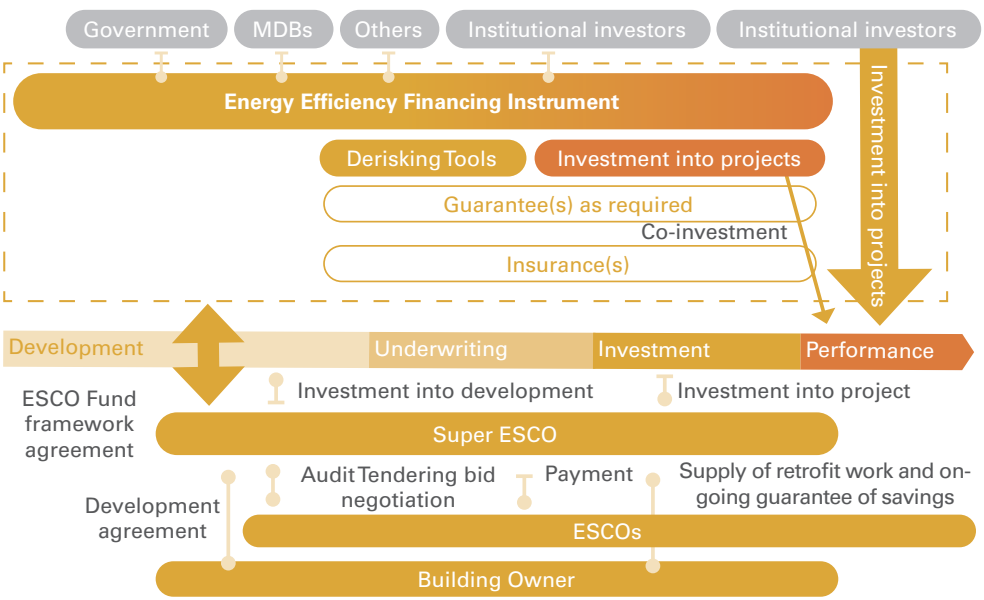


Progress of projects from development through to investment and implementation

B. THE SUPER ESCO MODEL

It is important to link Super ESCOs with regulatory changes to ensure adequate accreditation and certification of ESCOs, and to link them with available project finance.

Figure 5. Combined fund/Super ESCO instrument



C. AN INSTRUMENT FOR NEW HOUSING

The EcoCasa model has been successful in Mexico with scope to adapt the model for the Arab region, given the high rate of new buildings. Local adaptations will depend on the local institutional arrangements for funding new housing and the distribution of housing tenures. In the case of high levels of home rentals with large, public landlords, there is scope to scale up the model rapidly subject to funding.

There is an opportunity for the region to learn from global experience and systematically develop a flourishing ecosystem of financing instruments that address different market segments and are adapted to local conditions.

D. ENABLING EXISTING FINANCIAL INSTITUTIONS TO MODIFY EXISTING PROCESSES: EFFICIENCY FIRST

Existing financial institutions lending to or investing in for example renovations have existing customer relationships, lending facilities and processes which can be adapted and leveraged to promote higher levels of energy efficiency. Interventions in this area require building capacity, particularly within the existing real-estate finance sector, and changing investment or lending processes to ensure that opportunities for higher levels of efficiency are not missed.

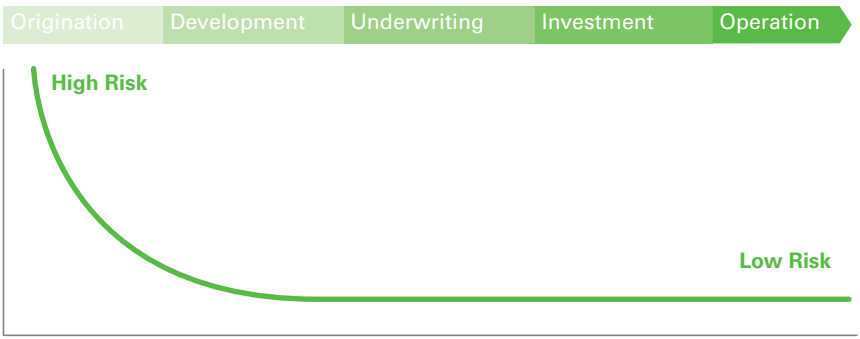
5 PROPOSALS FOR MODELS TO DERISK ENERGY EFFICIENCY

A. UNDERSTANDING RISK IN ENERGY EFFICIENCY INVESTMENTS

There is scarcity of data on the actual performance of energy efficiency projects of all types. This is in contrast to other asset classes, including wind power or solar power.

The risks of a project fall as it progresses, as shown in figure 6. Once a project is developed, it has lower risks and can be financed by a combination of equity and debt. After the performance of the project is proven, it may be possible to reduce the cost of the debt and/or increase the proportion of debt.

Figure 6. Stages in the project life cycle and risk profile



Source: Compiled by author, ESCWA.

B. MITIGATING RISK

1. Performance risks

(a) Design

- Selecting the design team carefully based on its previous results.
- Specifying the use of appropriate national or international standards in project design, development and documentation.
- Requiring designers to share all data, calculations and simulation files for quality control.
- Taking out insurance policies.
- Investors and lenders may choose to reduce savings projections (derating them) for use in a financial model.

(b) Equipment failure

- Selecting equipment vendors carefully based on experience, track record or approved vendor list.
- Requiring the longest possible warranties.
- Ensuring that manufacturers are able to stand behind the warranties offered.
- Ensuring that all equipment is operated as per the manufacturers specifications and that all required maintenance procedures are carried out.
- Selecting appropriate insurance policies.

(c) Operations and maintenance

- Using measurement and verification as a way to track savings over time and quickly identify variations in savings that could result from poor maintenance and other factors.
- Providing an operations manual and ensuring that operators are properly trained in the use of the equipment. This also applies to householders, especially when dealing with measures such as sophisticated thermostats and controls.
- Including continuous commissioning into contracts, whenever appropriate.
- Requesting basic operational performance warranties from maintenance contractors.

(d) Weather

It is essential to normalize reported savings taking into account ambient temperature when studying the impact of an energy efficiency measure.

(e) Risks from change of building use patterns

Proper measurement and verification procedures, combined with other monitoring practices and appropriate contract clauses, are essential to avoid disputes arising from changes in building use patterns.

2. Energy price risks

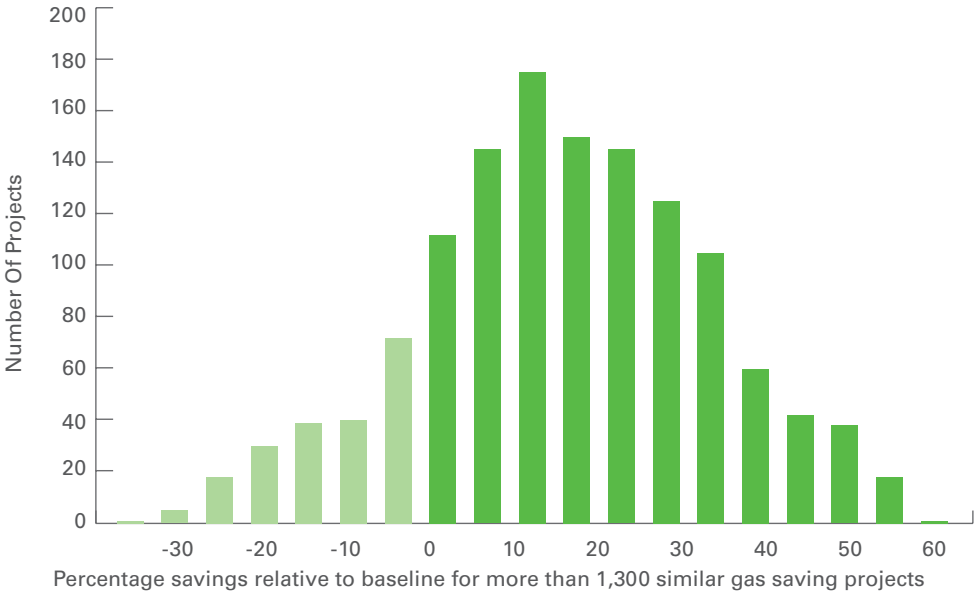
Clarity in the performance contract is important to overcome risks associated with energy prices that may alter bills despite maintaining the underlying level of energy savings, highlighting the importance of consumer education during the contracting period, and throughout the life of the measures.

3. Credit risks

Credit risk can be mitigated by using standard credit checking techniques and providing credit guarantees.

C. RISK ANALYSIS

Figure 7. Savings from a portfolio of more than 1,300 similar gas saving projects in California



Source: Golden, Matt, Adam Scheer and Carmen Best (2019). Decarbonization of electricity requires market-based demand flexibility. The Electricity Journal 32, Issue 7, August-September 2019, 106621.

D. MACRO-LEVEL DERISKING TOOLS

- Mechanisms to increase communication between the finance and energy efficiency industries, as part of capacity-building.
- Collection and dissemination of data on energy efficiency investments.
- Development and adoption of standards and standardized tools.
- Certification and accreditation schemes.
- Development of insurance markets.

E. INCREASING COMMUNICATIONS BETWEEN THE FINANCE AND ENERGY EFFICIENCY INDUSTRIES

It is important to increase contact and understanding between the energy efficiency industry and the finance industry. This is an important area for building capacity.

F. DATA COLLECTION AND DISSEMINATION

Establishing mechanisms through which data can be collected and shared can be an important way to build understanding of the actual risks involved in energy efficiency financing, building capacity within the finance industry and, hence, derisking investment.

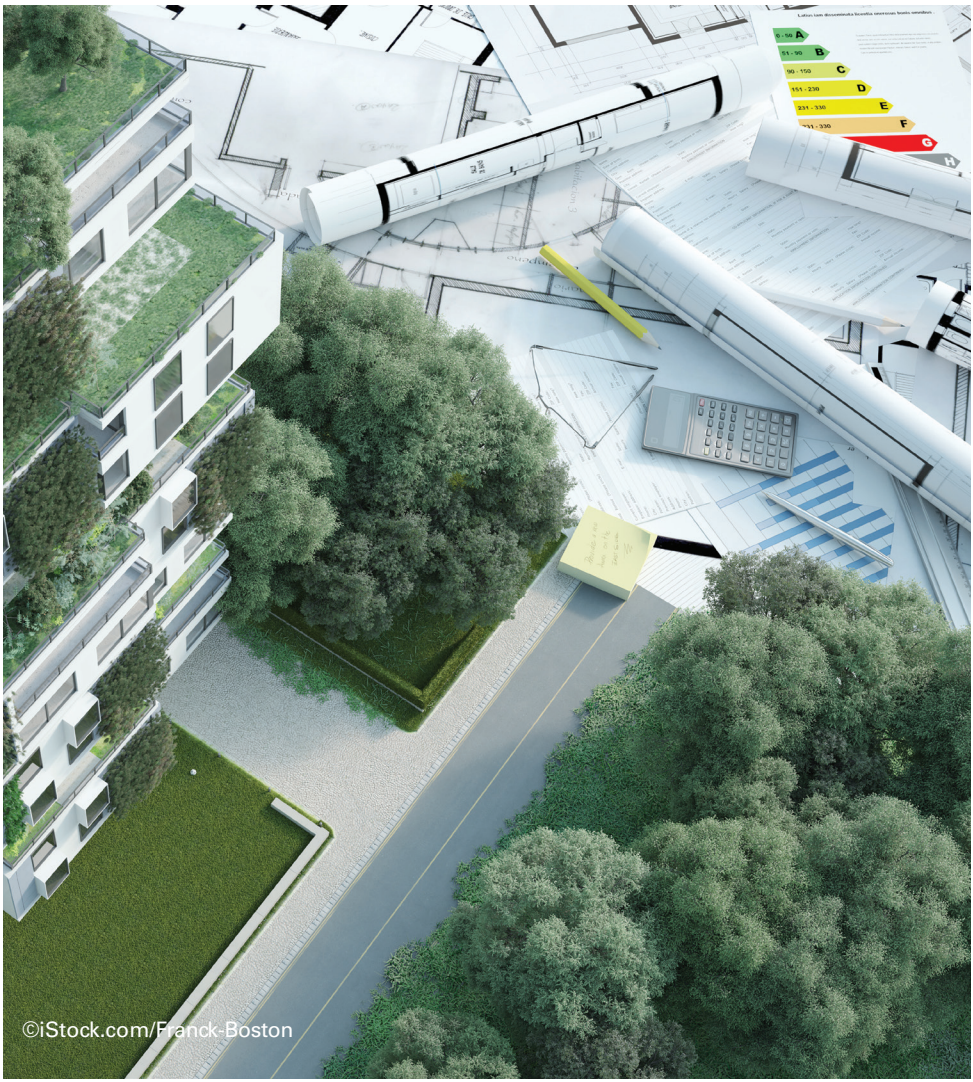
G. DEVELOPMENT AND ADOPTION OF STANDARDS AND STANDARDIZED TOOLS

Financing any category of projects, or asset class, at scale requires standardization in order to reduce transaction costs and risks, facilitate capacity-building within the finance sector and enable secondary markets to develop.

1. Standardization of project development and documentation: the Investor Confidence Project
2. Standardization of contracts
3. Other standardized tools
4. EEFIG Underwriting Toolkit – to assist financial institutions to scale up their deployment of capital into energy efficiency.
5. Certification and accreditation schemes – to build confidence in energy efficiency and energy services propositions, helping to increase transaction flow.

6 DEVELOPING A COMMON LANGUAGE FOR ENERGY EFFICIENCY FINANCING

To increase investment flows into energy efficiency, there is a need in all markets to increase communication between energy efficiency professionals and finance professionals. The two professions speak very different languages, and failure to communicate is a barrier to developing bankable projects and programmes.



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