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RENEWABLES
CITIES & REGIONS
ROADMAP

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100% RENEWABLES SOLUTIONS PACKAGE

Energy efficiency labeling for buildings



This solution is part of a package of solutions meant to guide local and regional governments in implementing a local renewable energy transition by providing guidance on mechanisms, applications or technologies that can help accelerate their climate and energy action.

It was produced as part of the 100% Renewables Cities and Regions Roadmap project, which supports nine cities and regions across Argentina, Indonesia and Kenya to develop bankable renewable energy projects and in-depth local strategy and action plans to achieve one hundred percent renewable energy. The 100% Renewables Cities and Regions Roadmap project is implemented by ICLEI – Local Governments for Sustainability and funded through the International Climate Initiative (IKI), which is implemented by the Federal Ministry for Economic Affairs and Climate Action (BMWK) in close cooperation with the Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and the Federal Foreign Office (AA).

DISCLAIMER

All cities are unique. The Solutions Gateway has been developed as an advanced knowledge catalogue to provide an overview of possible Low Emissions Development Solutions. The Solutions and Packages it contains provide guidance on general conditions, which may not correspond to the existing conditions in your city or jurisdiction. The consultation and use of the Solutions Gateway does not waive the need for the Local Government to assess the feasibility of a Solution or Package in the local context in its city or jurisdiction, prior to implementation. Please note that the impacts, benefits and co-benefits indicated are generally valid but may not materialize in particular circumstances.

ABOUT SOLUTIONS GATEWAY

[Solutions Gateway](#) is an online resource platform for Local Governments where they will be able to find possible Low Emissions Development (LED) Solutions for their cities.

In the context of the Solutions Gateway, Solutions are processes, or groups of actions, which Local Governments can implement to deliver climate change mitigation results and enhance local sustainable development. Taking an integrated approach, and focusing on Local Governments usual responsibilities and roles, Solutions include core actions as well as enabling and multiplying actions essential to maximize their effectiveness and efficiency. These include policy, regulatory, governance, capacity building, awareness raising, stakeholder engagement, etc.

ABOUT ICLEI – LOCAL GOVERNMENTS FOR SUSTAINABILITY

ICLEI – Local Governments for Sustainability is a global network working with more than 2,500 local and regional governments committed to sustainable urban development. Active in 125+ countries, ICLEI influences sustainability policy and drives local action for low emission, nature-based, equitable, resilient and circular development. ICLEI's Members and team of experts work together through peer exchange, partnerships and capacity building to create systemic change for urban sustainability.

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1. INTRODUCTION

To control the impacts of climate change, governments are promulgating and reviewing regulations in order to achieve energy savings in buildings. One important strategy employed to make these laws and regulations effective is through energy efficiency labeling for buildings. A simple way to provide energy efficiency information, such as labeling, can create greater awareness and lead homeowners, tenants and developers to opt for more efficient buildings, ultimately reducing energy use and emissions.

Building energy efficiency labeling is applicable to newly-built residential and public buildings, and also existing buildings by implementing an energy-saving retrofit. Residential and public buildings should be evaluated separately. The government's role is to propel the adoption of energy efficiency and conservation efforts in building design and operation, through policies as well as by fostering solid cooperation between governments, industries, businesses and associations.

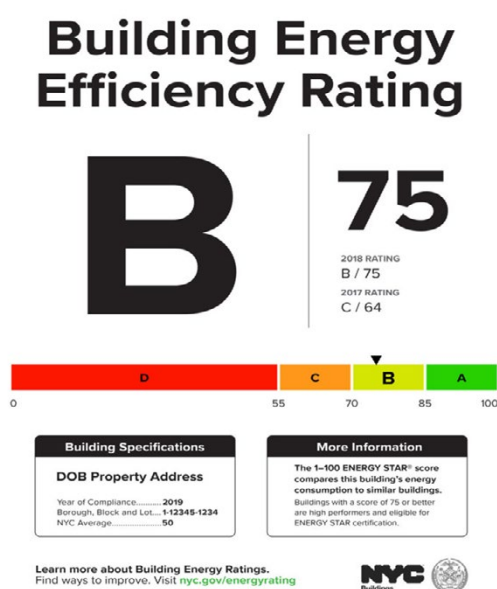
1.1 RELEVANCE

The overall objective of energy policies for buildings is to reduce energy consumption without compromising comfort, health and productivity levels i.e. greater efficiency. According to several scenarios, to meet net-zero targets, new buildings will need to be zero-carbon ready on a massive scale [1]. Regulatory bodies can employ regulations, auditing and certification as instruments for encouraging savings and maximizing energy efficiency in buildings.

The consequences of this growth, including its environmental impact, will continue to be felt. The building sector consumes on average one third of the total energy in most countries, and accounts for an even greater proportion of electricity use. Residential buildings account for over 20% of overall building energy use. Population growth, increasing formalized construction, demand for higher comfort levels and more time spent inside buildings all indicate an upward trend in energy demand that will continue into the foreseeable future.

1.2 MAIN IMPACTS

- Stronger valuation of labeled real estate for rent land for sale, as well as increasing market competition
- Increased investment, development and more local job opportunities in energy efficiency services
- Reduced energy consumption
- Reduced energy bills for users
- Enhanced consumer welfare
- Meeting of climate change mitigation and adaptation goals
- Reduced urban/regional pollution.



1.3 BENEFITS

- Cost savings from reduced energy expenditures due to greater efficiency
- Reduced energy demand due to higher efficiencies can lead to lower energy system costs and investments overall
- Efficiency improvements can limit energy demand growth without limiting economic growth
- Energy efficiency improvements would generally require changes in the behavior of a manageable number of manufacturers rather than the entire consuming public, making them more straightforward to implement
- The resulting energy savings are generally assured, comparatively simple to quantify, and readily verified
- Labeling can offer easy-to-digest information about a building's energy efficiency, allowing for easier comparison and shifts in consumption behavior.

1.4 SUGGESTED INDICATORS FOR MONITORING RESULTS

- The actual energy consumption of the regulated building [kWh]
- Growth in energy efficiency industry and services [currency/year; percentage]
- Effectiveness of the program: percentage of energy change in kilowatt-hours (kWh) per sqft
- Avoided emissions due to efficiency improvements [tCO₂e/year]
- Public expenditure avoided [currency/year]

1.5 TYPICAL LOCAL GOVERNMENT ROLES

- Policy maker
- Planner
- Legislator/regulator
- Mobilization and stakeholder engagement
- Education and awareness raising

2. INTEGRATED SOLUTION OVERVIEW

	Enabler Actions	Required Actions	Multiplier Actions
Policy	<ul style="list-style-type: none"> Define climate zones as the basis of the energy requirement calculation, in case of extremely different climates in different regions Establish strong and clear political legitimacy for performance standards 	<ul style="list-style-type: none"> Create a registry of the buildings and labels in the jurisdiction Regulate the activities of professionals including licensing and certification requirements, and create a registry if needed Establish general guidelines and targets across several defined energy efficiency criteria, including minimum standards, across various use types Define a clear penalty for non-compliance with the energy performance requirement Ensure that independent control systems and inspection mechanisms are established 	<ul style="list-style-type: none"> Develop complementary policies involving energy pricing and metering Announce a clear policy direction with a set timeline to allow industry and users to adapt Support voluntary participation by including quality marks, targets, and promotion campaigns Collaborate with national and regional technical agencies to access tools and other support
Stakeholders and Awareness	<ul style="list-style-type: none"> Encourage awareness of the buildings' energy performance with potential buyers or tenants and other stakeholders Create consumer education campaigns focusing on the conscious use of energy 	<ul style="list-style-type: none"> Increase stakeholder and consumer involvement in making energy-efficiency choices through public review and consultation Publicizing relevant energy efficiency indicators in the media or public buildings to set an example 	<ul style="list-style-type: none"> Create a communications plan for all stakeholders to keep them up to date on program progress and advancements
Governance	<ul style="list-style-type: none"> Create technical working groups within local authorities to exchange on energy efficiency standards and indicators, and the best way forward for implementation 	<ul style="list-style-type: none"> Adopt standards based on existing international standards or best practices at the national or international level Collaborate with regional and national government agencies for appropriate energy evaluation standards 	<ul style="list-style-type: none"> Mainstream energy efficiency standards and labeling in existing expansion and zoning plans

	Enabler Actions	Required Actions	Multiplier Actions
Capacity Building	<ul style="list-style-type: none"> • Raise awareness and educating all professionals in the sector is a crucial policy instrument • Assess the availability of the qualified labor force 	<ul style="list-style-type: none"> • Provide specialized training and formation to the certifiers • Execute a mandatory examination of the certifiers' skills • Set educational pre-requirements for the professional that wants to become a certifier 	<ul style="list-style-type: none"> • Implement programmes for a continuous professional development of the experts and the accreditation must be renewed periodically • Cooperate with international organizations and networks to align standards and certifications with best practices
Technical	<ul style="list-style-type: none"> • Provide information and tools adapted to local contexts, including open datasets for urban microclimates etc. 	<ul style="list-style-type: none"> • Definition of the energy performance index • Development of an energy performance calculation tool • Setting a threshold value for the performance index • Definition of the comparison scenario • Definition of the scale for energy labeling • Identification of potential energy efficiency measures • Gathering energy information in the certification process 	<ul style="list-style-type: none"> • Support research and development of new technologies for energy efficiency • Engage with industry and experts to provide technical assistance and capacity building
Finance	<ul style="list-style-type: none"> • Attract investments to improve the system and the program in general through awareness 	<ul style="list-style-type: none"> • Assessment of available funding lines (public, private, PPP etc.) • Stipulate a price for the cost of certification and labeling • Identify the kind of building owners (e.g. people who build their own homes, or commercial developers) and create targeted plans for each 	<ul style="list-style-type: none"> • Local jurisdictions can issue loans to homeowners to finance their energy efficiency improvements or investment in renewable energy technologies • Roll out pilot programs targeting energy efficiency for specific sectors, to help develop awareness and skills, attract finance and develop a local value chain



3. WORKFLOW / PROCESS PHASES

3.1 PREPARATION

- Assessing how local cultural, institutional, and political factors are likely to influence the adoption and effectiveness of such programs
- Rely on existing test facilities, test procedures, label design, and standards already established by international organizations or neighboring countries
- Assess the data needs of the program and the capability of the government to acquire and manage those data; consider making such data publicly available where appropriate
- Screening and selecting which types of buildings are the highest priorities
- Estimate the potential impact of the standards by quantifying their environmental and monetary benefits by collecting and interpreting new local data on and their use
- Develop the label design requirements, usually involving consumer research
- Assess the energy performance of the existing building stock in the country
- Establish the technical feasibility and cost of each technology option that might improve energy efficiency as well as evaluating its impact on overall performance.
- Analyze the societal costs and benefits of any proposed standard
- Evaluate the impacts on gas and electric utilities and future gas and electricity prices that would result from reduced energy consumption
- Estimate the beneficial environmental effects in terms of changes of emissions of pollutants such as carbon dioxide, sulfur oxides, and nitrogen oxides that would occur in residential and commercial buildings and power plants as a result of reduced energy consumption
- Determine which communication and outreach strategies are most suited, and which groups to target

3.2 IMPLEMENTATION

- Get the approval of the appropriate constitutional, legislative, and administrative authority and begin implementation within the proposed framework
- Register the labels managed in the jurisdiction
- Regulate the exercise of professionals through licensing criteria etc.
- Establish general guidelines and define unified criteria
- Generate the tools for implementation that are supported by national technical agencies and make them available

- Specify when the label is requested to grant permits and certifications
- Set minimum standards for each label
- Increase stakeholder and consumer involvement by processing public review and revision
- Create the institutions responsible to evaluate and execute the labeling
- Establish strong and clear political legitimacy for standards
- Choose the tool to assess the energy efficiency of the building, obtain the label according to the procedures established, and give recommendations for improvement and to quantify its impact

3.3 MONITORING

- Develop a monitoring and evaluation plan and define appropriate targets and indicators for efficiency—e.g. energy use, energy intensity, pollution etc.
- Collect and analyze data, applying the evaluation results where appropriate
- Refine the design, implementation, and evaluation of the labeling and standards-setting programs
- Support other energy programs and policies
- Support accurate forecasting of energy demand for strategic planning
- Certify and monitor compliance, ensuring that the certified buildings meet the requirements or a minimum energy-efficiency standard during and after certification
- Enforce the labeling regulations dealing with constructors and building owners that are not in compliance with the regulations
- Establish the economic impacts on individual consumers of any standard being considered
- Examine the impact of any standard being considered on international and domestic manufacturers and their suppliers and importers.
- Periodically evaluate performance and updated or revise strategies as needed

4. REALITY-CHECK

This solution is applicable for:

- Cities, local communities and territories that need more data transparency and accuracy in energy management and want to reduce their energy use/intensity
- Policymakers that want to increase energy efficiency and decarbonize buildings to achieve national and international commitments
- Cities that want to ensure a more conscious usage of the energy while keeping the comfort and well being of its citizens, and incurring other benefits such as reduced energy expenditures etc.
- Local governments who need a tool to guide urban planning to be more energy efficient through building codes and permits

4.1 REQUIRED PRE-CONDITIONS

- Qualified labor force and a technical body to manage the execution of the project
- Economic and tax incentives to spur adoption and action

- Existence of funding potential through various sources
- Great alignment and cooperation between the government departments, construction units, the public, and other related entities

4.2 SUCCESS FACTORS

- Effective communication and awareness creation
- Engagement with relevant stakeholders
- Constant learning from national and international best practices
- Good monitoring of buildings and construction with qualified personnel present where needed, and the enforcement of standards
- Alignment with regional and national policies
- Political commitment to mainstream energy efficiency as part of climate and energy action plans

4.3 FOLLOW-UP NEEDED AND/OR RECOMMENDED

- Continuously monitoring the results of the cost-optimal calculation requirements
- Examine the possible effects of a further tightening of requirements on the basis of cost-optimal calculations
- Examine exemptions for building for temporary use, historical buildings, holiday houses and buildings under 50 m², etc.
- Conduct random sampling to ensure compliance with the regulations and quality checks for the validation of the incoming certificates

4.4 BARRIERS

- Lack of enough professionals in the area trained to certify buildings; this can be managed through collaboration with academic institutions, international organizations offering technical assistance etc.
- The building assessment can be a long process, sometimes requiring technical information from third-parties, extending even more the time required to issue the label
- People might not be aware of their home's energy consumption nor the importance of energy efficiency; effective communication and stakeholder engagement can help overcome this
- Low interest from investors in energy efficiency, possibly due to a lack of awareness about its potential and returns—this can be addressed by investing in capacities for project development, creating good business cases and innovative business models to attract funding
- Individual building owners and managers tend to be more sensitive to total implementation costs rather than to actual energy savings; targeted financial support could help overcome such hesitancy
- Long payback periods for home energy improvements to deliver a return on the investment

4.5 RISKS

- If the program doesn't have consolidated resources and support, the system might become overloaded, impairing the energy labeling program's efficacy
- Structural features of the market, such as construction rate, availability of technology, and climate can influence the cost-effectiveness of the program

- The risks of corruption, for example certification expert can be unreliable or untrustworthy, undergo insolvency proceedings or be economically involved in the project they have certified

5. CLIMATE CHANGE MITIGATION POTENTIAL

Energy-efficiency labels and standards, as part of broader energy efficiency measures, can help a country meet climate change goals. Reducing energy consumption not only decreases GHG emissions due to the reduced reliance on expensive fossil-fuel power plants, but it also makes the transition to renewable sources of energy more feasible due to the smaller size of the system. Labeling in particular can help publicize information on building energy consumption to the public or property owners based on energy efficiency evaluation results, increasing the alignment among government departments, construction units, the public, and other related entities, generating awareness for others and creating behavioral incentives. This can help strengthen the whole process of building energy-saving management, guide rational energy consumption and promote the construction of a resource-saving and environment-friendly society and help achieve national and international climate goals.

6. NATIONAL – SUBNATIONAL INTEGRATION IN THE CONTEXT OF THIS SOLUTION

6.1 BENEFITS TO LOCAL GOVERNMENT

Successful implementation can help develop a local value chain and expertise, and position the city as a pioneer in the area. This can help the city influence regional and national policy through successful demonstrations, improving overall vertical integration.

6.2 BENEFITS TO OTHER LEVELS OF GOVERNMENT

Since such policies can be implemented at the local level, they provide a good testing ground for the national and regional government to identify and upscale best practices.

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