

International & National Best Practices, Policy Analysis and Recommendations for Sustainable Housing in India

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Creating Markets, Creating Opportunities



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List of Abbreviations

ACT	Australian Capital Territory	GRIHA	Green Rating for Integrated Habitat Assessment
BBMP	Bruhat Bengaluru Mahanagar Palike	IGBC	Indian Green Building Council
BEE	Bureau of Energy Efficiency	KTPP Act	Karnataka Transparency in Public Procurement Act
CASBEE	Comprehensive Assessment System for Built Environment Efficiency	LEED	Leadership in Energy and Environmental Design
CDM	Clean Development Mechanism	MAHA-GENECO	Maharashtra state power generation corporation limited
CEN	European committee for standardisation	MHADA	Maharashtra Housing and Area Development Authority
CER	Certified Emission Reduction	NatHERS	Nation wide House Energy Rating System
CIDC	Construction Industry Development Council	NHB	National Housing Bank
COBRACE	Ordinance on the Brussels air, climate and energy code	NISE	National Institute for Solar Energy
DEA	Danish Energy Agency	NZEB	Near Zero Energy Building
DGCCRF	General directorate for competition, consumption and fraud repression	PMAY	Pradhan Mantri Awas Yojana
DHW	Domestic Hot Water	PPP	Public-Private Partnership
DSM	Demand Side Management	SDA	State Designated Agencies
ECBC	Energy Conservation Building Code	SPV	Solar Photovoltaic
ECBD	Energy Conservation Building Directive	TDR	Transferable Development Rights
ECCJ	Energy Conservation Centre for Japan	ULB	Urban Local Body
EEA	European Economic Area	UNFCCC	United Nations Framework Convention on Climate Change
EED	Energy Efficiency Directive		
ENEA	National agency of energy and environment		
ESCO	Energy Services Companies		
EU	European Union		
FAR	Floor Area Ratio		
FDI	Foreign Direct Investment		
GHG	Green House Gases		
GLA	Greater London Authority		
GM GFA	Green Mark Gross Floor Area		

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Executive Summary

The Indian Institute for Human Settlements (IIHS) researched and analysed sustainable housing initiatives, current and previous, across the European Union (including the United Kingdom), Oceania (largely Australia) and East Asia (China, Japan, Korea and Singapore) to understand the key drivers and outcomes of the policy provisions. This exercise comprised of desk research and brief preliminary interactions with experts in the field. It was extended to the states and cities in India that have enabling provisions in policy and regulations for sustainable buildings and housing. These included national level policies and programmes and their subsequent adoption at state and city levels. This was followed by an assessment of their operational frameworks, leading to the emergence of key analytical questions spread over major stages of housing development. Last, a consolidation of preliminary policy touch points that could provide the consortium with an opportunity to suggest suitable modifications or interventions, have been provided.

The following paragraphs summarise key findings of this phase of work.

European Union (EU)

The EU largely depends on an enabling financial architecture to encourage sustainable development and housing. These include the development of a green corpus at the national, and in some cases, at the city level. This was supported with preferential interest rates on capital finance. A strict adherence to environmental law and directives was reported, leading to the widespread adoption of green building practices. Financial instruments include retrofitting grants and loans along with the development of new stock, in recognition of the fact that operations of existing buildings contribute significantly to carbon emissions and environmental degradation. National policies in the EU are supported by key city regulations. The EU reports significant outcomes coupled with a

robust monitoring and reporting system.

Oceania and East Asia

Australia leverages a mix of strategies to contain carbon emissions and maintain biodiversity. These range from direct grants (including subsidies for low income housing) to the ‘baking’ of energy efficient standards into building and equipment codes. While Japan encourages sustainable housing through direct grants/subsidies for equipment and retrofitting together with training programmes and penalties for non-compliance, China chooses to implement a financial reward system for compliant developments, along with tax rebates on sustainable materials. Korea and Singapore employ a mix of strategies – from direct non-financial incentives (relaxations in floor areas, height restrictions and floor prices from local guidance values) to direct financial incentives (rebates in property tax and external development charges). Australia and East Asia report significant outcomes in terms of sustainable built-up area.

India

The Government of India promulgated the National Mission for Sustainable Habitat (NMSH) and the National Mission for Enhanced Energy Efficiency (NMEEE) through the Ministries of Urban Development (MoUD) and Ministry of Power, respectively. These, coupled with state and city level changes in policy frameworks and regulatory provisions have made India a new arena for experiments at the interface of policy design and sustainable housing. These policy interventions recommend a slew of measures to make new developments more sustainable including the Energy Conservation Building Code (ECBC) and direct grants for sustainable energy production. Punjab, Uttar Pradesh, West Bengal and Haryana have moved to incorporate ECBC in their building codes and practices. They have also developed a set of incentives for developers to create sustainable

buildings. Individual cities such as Pune, Pimpri-Chinchwad, Jaipur, Greater Noida and Hyderabad have taken initiatives to further encourage green buildings in the commercial and residential sectors. A majority of these measures include the provision of additional Floor Area Ratio (FAR) and rebates on taxes and levies that benefit builders as well as end users.

Key Analysis Points for Policy Encouragement for Sustainable Housing

The first step in the study was to develop a rich compendium of policy instruments covering the various regions mentioned, followed by an analysis of their outcomes. Based on discussions with the Sustainable Housing Leadership Consortium (SHLC) partners, a framework was developed that recognised the key steps in the housing development cycle:

1. Land title and clearance
2. Project finance
3. Building plan approvals
4. Implementation
5. Occupation
6. Monitoring

The key areas of intervention that emerged from the analysis were:

1. Pre-certification, as a potential tool to facilitate sustainable housing which comes with its difficulty in monitoring and auditing
2. Policy linkage to financial instruments and its optimal utilisation (to be addressed by a separate pillar of SHLC)
3. Tracking and monitoring of the implementation of Green Building codes
4. Impact and offset of incremental FAR on service infrastructure
5. Building the capacities of approving authorities to cater to integrated approvals swiftly
6. Addressing the cost of financial incentives on the revenue of the local body or agency and examining the potential for lateral translation to other utilities.
7. Offsetting capital expenditure through the adjustments in state and national tax regimes.
8. Subsidising sustainable equipment and technologies
9. Skill building of sustainable building technologies, materials and equipments (to be addressed by a separate pillar of SHLC)

10. Effective operation and encouragement of cash rewards for exceeding benchmarks, and penalties for non-compliance

11. Building the monitoring capacities for energy audits and labelling (ESCO in residential sector)

Within this framework of analysis, assessment and discussion with SHLC partners, the following preliminary potential policy touch points emerged:

1. Direct support from the Government of India/ State Governments to enable local capacities (ULBs, ESCOs, utilities, agencies)
2. Convergence of policies/interventions across the disciplines of power, climate and housing at local, regional and national levels such as framing an institutional design for fast track approvals / single window clearances
3. Instituting forms of indirect incentives such as additional floor areas, transferable development rights, relaxations in height restrictions and relaxation in the surrender of civic amenities/open areas to the local government.
4. Formulating rebates/mechanisms to lower expenditure on various taxes, levies and charges at the local, state and central levels. For example:
 - At the city government (ULB) and city agency level: Property tax rebates, concession in utility connection charges and external development charges, concession for city level NOC charges
 - At the State government level: Rationalisation of stamp duties, registration fees, state level NOCs, state taxes on sustainable materials, equipment and technologies
 - At the Central government level: Reduction in tax for sustainable materials, equipment and technologies
5. Potential for translating incentive structures for affordable housing to sustainable housing.
6. Introduction of a labelling system (for the company or the product or the building material) as a means to enhance the visibility of sustainable housing. This has been implemented to some extent by the BEE and the LEED and GRIHA rating systems for products and building materials. This could be studied as a precedent for its execution and viability. The labelling system could also be further extended to direct gains by linking them with preferential approvals, lower interest rates and green funds.

Introduction

The International Finance Corporation (IFC) of the World Bank Group (WBG) has commissioned the Indian Institute for Human Settlements (IIHS) to conduct a policy analysis to develop potential policy bundles supported by analytical evidence, reference cases and implementation protocol to encourage sustainable housing at scale.

The primary objectives of the project are to:

- Analyse national and state level regulatory/policy frameworks for Maharashtra and Karnataka and city level regulatory/policy provisions for Mumbai and Bengaluru
- Identify key policy touch points and prioritisation of the same, in light of international practices
- Develop policy bundles, in the context of effective alignment with national, regional and local priorities on climate change and sustainable development
- Develop a protocol that articulates implementation of the identified policy bundles

The main activities of IIHS include:

- Analysing current policy scenarios through quantitative and qualitative assessment frameworks of the best international practices and identifying key prioritised policy touch points in consultation with stakeholders and SHLC partners

- Developing implementable policy bundles, supported by quantitative assessment frameworks with the associated sensitivity analysis, including recognition of inputs from four participatory workshops conducted by IIHS with IFC
- Developing the aforementioned, leading to the articulation of a feasible implementation protocol based on relevant reference cases and national and international best practices, particularly in the context of potential commitments on sustainable habitat and housing.

This report is divided into three broad sections:

1. A compendium of national and international best practices in policy support towards sustainable housing.
2. Draft analysis of best practices as per stages of housing development.
3. Potential policy touch points to encourage sustainable housing.

Compendium of National and International Best Practices in Policy Support towards Sustainable Housing

This chapter reports on selected international and national best practices and policy frameworks. This compendium of best practices, their implementation and outcomes (wherever validated information is available) is presented in 3 Sections:

Section 1	India
Section 2	European Union
Section 3	East Asia & Australia

Note on Selection of Regions and Methodology

The cities, regions and nations were largely selected on the basis of consultations between the SHLC partners, IFC and IIHS. The regions studied represent mature as well as developing markets and policy regimes in the field of sustainable urban development and housing.

Secondary data from government websites and reports from energy and development sector institutes/organisations were referenced to develop this compendium of policy instruments.

I India

India is urbanising rapidly. Close to 600 million Indians are expected to be living in urban areas by 2030. The pattern of urbanisation is characterised by an increase in pressure on Tier 1 cities to house more than 65% of the urban population, causing immense regional stresses on energy, water and other resources.¹

While there is no consensus on the quantum of built up area in urban India, the building sector is responsible for 30% of the overall electricity consumption in the country. 72% of this electricity is consumed by the residential sector.²

The average Indian household is likely to consume five times more electricity in 2020 than in 2000. An

increasing trend of appliance ownership by households is reported, leading to an increase in demand of fuel. Using 2011 levels as reference, the electricity consumption for heating/cooling appliances and for lighting applications will grow by 180% and 80% respectively by 2021.³

Apart from energy use, the building sector is also responsible for approximately 12% of the fresh water use, and the generation of an estimated 22,900 million litres of wastewater per day. Building construction and demolition waste contributes 60% to overall waste generation. Buildings are also responsible for a huge quantum of the electronic and municipal waste generated.

The embodied energy of the building sector is increasing exponentially due to the high rate of growth of construction (10-15% p.a.) and choice of materials. Production of an estimated 170 billion bricks annually consumes around 24 million tonnes of coal and the process emits 61.3 million tonnes of CO₂ into the atmosphere.

In this context, energy and resource efficient buildings become imperative, if not critical for the environment and the health of the sector.

Green Buildings

The Indian construction sector has commenced its efforts towards a greener development trajectory. Businesses and governments are increasingly striving to work together to encourage development that balances resource efficiency, environmental responsibility, occupant comfort and well-being.

A building which uses an optimum amount of energy and water, conserves natural resources, generates less waste and creates spaces for healthy and comfortable living, as compared to conventional buildings, is a green building.¹⁴ This integrated approach to buildings is supported by various policies and programmes by different levels of governments.

Relevant Institutions for Sustainable Housing Policy Interventions	
NATIONAL LEVEL	
The Ministry of Housing and Urban Poverty Alleviation	Responsible for formulating policies, sponsoring, supporting and monitoring of programmes related to housing in India.
The Ministry of Urban Development	Apex authority of Indian government for formulating policies, supporting and monitoring programmes and coordinating the activities of various central ministries, state governments and other nodal authorities for all urban development in the country.
The Ministry of Power	Primarily responsible for the development of electrical energy in the country. Responsible for the Administration of the Electricity Act, 2003, the Energy Conservation Act, 2001. Undertakes amendments to these Acts, in conformity with the Government's policy objectives.
The Ministry of New and Renewable Energy	It is a nodal ministry of the Government of India for all matters related to new and renewable energy.
The Ministry of Environment Forests and Climate Change (MoEFCC)	It is a nodal ministry of the Government of India for the planning, promotion, co-ordination and overseeing the implementation of India's environmental, forestry and climate change policies and programmes. It provides environmental (Environmental Impact Assessment) clearance to large construction projects.
National Buildings Organisation	The premier construction agency of the Government, responsible for the planning, construction and maintenance of government buildings.
Bureau of Energy Efficiency (BEE)	It is a statutory body under the Ministry of Power, Government of India. It was set up by the government under the provisions of the Energy Conservation Act 2001.
The Construction Industry Development Council (CIDC)	Setup by the erstwhile Planning Commission, Government of India jointly with the Indian construction industry as an apex organisation to take up and promote activities for the development of the Indian construction industry.
ASSOCIATIONS	
The Confederation of Real Estate Developers Associations of India (CREDAI)	Brings together more than 9,000 real estate developers from 152 city chapters across 23 states of India.
National Real Estate Development Council (NAREDCO)	This is as an autonomous, self regulatory body formed in 1998 under the Ministry of Housing and Urban Poverty Alleviation, Government of India
STATE LEVEL	
Ministry/Department of Housing and Urban Development	A state level apex authority for housing and urban development.
Power/Energy Department	A state level nodal agency for all energy and efficiency related initiatives.
Pollution Control Board	Implements the Air and Water Act at the state level.
Revenue Department	A nodal department for the registration of land, maintenance of land records. It also records change of land use.
State Environmental Impact Assessment Authority and State Expert Appraisal Committee	Gives environmental clearance to big construction projects through an Environmental Impact Assessment (EIA).
LOCAL LEVEL	
District Authorities	District level environment authorities and urban development cells
Urban Local Bodies (ULB)	City governments that formulate master plans and developmental control regulations, as well as assume responsibility for the collection of city level taxes and fees

Table 1.1.1: List of Indian Institutions ⁴

Green Building Rating Systems

India follows two types of rating systems to measure the energy performance of buildings:

- Green Rating for Integrated Habitat Assessment (GRIHA) which was conceived by The Energy and Resources Institute (TERI) and jointly developed by the Ministry of New and Renewable Energy (MNRE) as the national rating system for buildings.
- LEED-India Programme was adopted from the United States Green Building Council's Leadership in Energy and Environmental Design (LEED) in 2001 as a private initiative run by the Indian Green Building Council (IGBC) in India.

	GRIHA	LEED
Inception year	2007	2001
Total buildings registered (as of March 2017)	875	3,976
Registered area (as of March 2017)	36 million sqm	418 million sqm
Accredited professionals (as of March 2017)	NA	2,323

Table 1.1.2: Indian Rating Systems⁵

Laws

The Parliament enacted the Energy Conservation (EC) Act in 2001, which mandates energy efficiency in buildings. Under the provisions of this act, the Bureau of Energy Efficiency (BEE) was constituted. The mission of the BEE is to assist in developing policies and strategies with a thrust on self-regulation and market principles, with the primary objective of reducing energy intensity of the Indian economy. States & Union Territories (UT) have identified State Designated Agencies (SDAs) to assist in the implementation of the various schemes and programmes developed by the BEE under the EC Act.⁶ To promote energy efficiency in both existing and new commercial buildings, several initiatives have been taken up by the BEE. These include the creation of the Energy Conservation Building Code (ECBC) and its promulgation, monitoring and implementation of energy efficiency measures in existing and new government buildings.

In accordance with the Environment Protection Act, 1986 environmental clearance has been mandated for buildings with a built up area equal to or exceeding 20,000 sqm. The Government of India has been amending the rules and structural framework to

obtain such clearances to encourage green buildings and balanced development.

Policies and Programmes

National Urban Housing and Habitat Policy (NUH & HP), 2007

This policy aims to provide affordable housing for all sections of society with an emphasis on economically weaker sections and low income group households. It seeks to enhance energy and cost efficiency and promote Public-Private Partnership (PPP) for housing projects.⁷

National Mission on Sustainable Habitat (NMSH), 2010

One of the 8 missions under the National Action Plan on Climate Change (NAPCC), the NMSH seeks to mandate the Energy Conservation Building Code developed by the Bureau of Energy Efficiency and promote green building rating systems. It employs a host of incentives ranging from tax benefits to low interest loans for the construction of energy efficient houses.⁸

Integrated Energy Policy (IEP), 2006

This policy identifies significant potential energy savings in the building design, construction, heating, ventilation and air-conditioning (HVAC), lighting and household appliances sectors. Implementation of Demand Side Management (DSM) options is expected to reduce electricity demand through energy efficient buildings, processes, lighting and equipment, by an estimated 15% by 2031-2032, which is equivalent to a reduction of 152 million tonnes of oil. (i.e. 381 metric tonnes of Indian coal)⁹

Bureau of Energy Efficiency (BEE)

The bureau promotes measures to augment energy savings in new and existing buildings. The ECBC sets minimum standards for new commercial buildings that have a connected load of 100 kVA or a contract demand of 120 kVA. In the area of retrofitting, Energy Service Companies (ESCOs) provide a business model through which the energy-savings potential in existing buildings is captured, and the risks faced by building owners is addressed. The BEE does an accreditation exercise for applicants through ESCOs rating them on the basis of successful implementation of energy efficient projects. 139 ESCOs have been empaneled by the BEE (as of March 2017). The BEE has not only formulated the Energy Conservation Building Code, but has also integrated it into other compliance systems such as the Environmental Impact Assessment, GRIHA and LEED.¹⁰

Energy Efficient Solar Homes & Buildings

Under this scheme various incentives are provided to the stakeholders of green buildings for enabling sustainable technologies.

The following are major provisions under this scheme:

- A budget of INR 10 crore was allocated for the implementation of the scheme during the year 2013-14.
- Financial support to implementing agencies was provided for organising training programmes, workshops, conferences, seminars, publications, awareness campaigns, orientation programmes, etc.
- Cash awards were provided to best performing ULBs, architects and designers.¹¹

Maharashtra Solar Energy Policy, 2016

Under this policy, land for grid connected solar energy projects is deemed to be non agricultural land, resulting in a time and cost reduction for the land use conversion process. In addition under this policy, duties on electricity would not be levied for the first 10 years. The policy directs a 5% use of district budget funds, out of which 3% is used for rooftop / on ground solar PV system. An incentive of INR 20/W or 20% of the installation cost, (whichever is lower) is also provided for the generation of solar power from 5kW upto 20kW. Households are provided an incentive of INR 1,500 for installing solar water heating system of 1 cum capacity.¹²

Karnataka Affordable Housing Policy, 2016

For approved affordable housing projects, faster conversion to residential use or deemed status as non agricultural land as well as a rationalisation of stamp duties is provided. Incentives in the form of Transferable Development Rights (TDR) and additional Floor Area Ratio (FAR) are provided in case of in-situ slum redevelopment and affordable group housing PPP projects, as under the provisions of the KTHA Act 1961. Affordable housing projects are exempted from payment of the building plan sanction/approval fee.¹³

Ratings Related Incentives

Certain incentives are offered to developers to encourage adoption of measures stipulated by the green building rating framework throughout the project cycle. The following sections briefly describe some of these incentives at the national, state and city levels.

The following section describes the key institutions and organisations associated with sustainable development at national, regional and local levels in India.

National Level

Since 2006, projects which have obtained green building rating (pre-certification or provisional certification) under GRIHA/IGBC-LEED get priority for their consideration, by the expert appraisal committee/state level expert appraisal committee for environmental clearance.¹⁵ In December 2016, the government put in place a new framework and an institutional structure for streamlining the environmental clearance for the building and construction sector. The main provisions under the 2016 framework are as below:

- Environmental clearance and building permissions at the ULBs would be issued in an integrated manner for all buildings from 20,000 sqm to 1,50,000 sqm of built-up area.
- Environmental clearance for built-up areas from 1,50,000 to 3,00,000 sqm would be given by the State Environmental Impact Assessment Authority while projects with built up area above 3,00,000 sqm would need to be approved by the Central government.
- Projects with a built up area less than 20,000 sqm will only be subject to a self-declaration.
- The consent to establish and operate under the Water (Prevention and Control of Pollution) Act, 1974 and the Air (Prevention and Control of Pollution) Act, 1981 will not be required from the State Pollution Control Boards for residential buildings of built-up area up to 1,50,000 sqm.¹⁶

As of March 2017, more recent amendments such as the ones above are being contested by various interest groups, and the National Green Tribunal is yet to pronounce a verdict on their implementation and constitutionality.

State Level	
The Punjab Municipal Green Buildings Incentives Policy, 2016	Compliance with the Punjab ECBC is mandatory for buildings with a connected load of more than 100 kW or a conditioned area of 500 sqm or more.
	15 % rebate in property tax for ECBC compliant buildings
	Additional 5% FAR on the submission of a green building certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or the IGBC (gold or platinum)
	Projects are reviewed by the rating agency every 3 years (the penalty for non-compliance is equivalent to 5 times of the incentive amount received)
Uttar Pradesh Urban Development Department Notification, 2015	Additional 5 % FAR on the submission of a green building certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum) for buildings constructed on a land area of more than 5000 sqm.
	Projects are reviewed by the rating agency every 5 years (the penalty for non-compliance is equivalent to 200% of the incentive amount received)
	5 % to 20 % additional FAR for installing a solar photovoltaic power plant
	5% to 25% Additional FAR for green rated buildings
	5 % Additional FAR for installing a solid waste treatment plant on site
West Bengal, Department of Municipal Affairs Notification, 2015	Additional 10% FAR on the submission of a green building certificate from GRIHA(4 or 5 star), LEED (gold or platinum) or IGBC(gold or platinum) on the basis of pre- certification
	Periodic inspection by the rating agency (the penalty for non-compliance is equivalent to 150% of the incentive amount received)

Table 1.1.2: State Level Provisions¹⁴

City Level	
Jaipur Development Authority, 2014	Mandatory compliance with the ECBC and certification by the Rajasthan Renewable Energy Corporation Limited
	Additional 5 % FAR on the submission of a Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or the IGBC (gold or platinum)
	Projects are reviewed by the rating agency every 3 years (the penalty for non-compliance is equivalent to 200% of the incentive amount received)
Greater Noida Industrial Development Area Building Regulations, 2016	Additional 5 % FAR on the submission of a Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or the IGBC (gold or platinum)
	Projects are reviewed by the rating agency every 5 years (the penalty for non-compliance is equivalent to 200% of the incentive amount received)
Pune Municipal Corporation, 2016	5% to 15% premium on the building permission fees for IGBC rated buildings
Pimpri-Chinchwad Municipal Corporation, 2011	5% to 10% discount in the property tax to occupants for adopting GRIHA
	10% to 50% of premium to developers for adopting GRIHA
Greater Hyderabad Municipal Corporation, 2012	10% rebate in the property tax for installing and using solar heating and lighting system
	10% rebate in the property tax to undertake both waste water recycling and rain water harvesting
Ministry of Urban Development, Delhi Division, 2013	1% to 4% extra ground coverage and FAR based on the GRIHA rating

Table 1.1.3: City Level Provisions¹⁴

International Co-operation

As a signatory to the United Nations Framework on Climate Change, India has been actively pursuing international co-operation and assistance in the domain of green buildings.

India - Germany	Under the Indo-German Financial Cooperation, KfW is entrusted by the Federal Ministry for Economic Cooperation and Development (BMZ) to promote the implementation of an energy efficiency programme for new residential buildings in India.
	KfW extends a line of credit of EUR 50 million to the National Housing Bank (NHB). The NHB channels funds to commercial banks which in turn provide loans for energy efficient homes.
	New residential buildings that implement passive energy efficiency measures that use at least 18 per cent less, and in case of active energy efficiency measures, use 30 per cent less electricity than the standard building, receive a certificate that entitles the buyer to a loan re-financed by the NHB under this programme. ¹⁷
India - Switzerland (Indo-Swiss Building Energy Efficiency Project : BEEP)	A five-year MoU to facilitate the adoption of Swiss expertise to reduce the energy consumption in Indian buildings was signed in 2010 and has been extended to 2021. ¹⁸
	BEE is the nodal agency in India for this programme.
India - Sweden	MoU on sustainable Urban Development.
	Swedish-Indian partner companies to develop solutions for producing biogas from waste water and food wastes.
India - France	MoU signed between the Ministry of New and Renewable Energy and France's Ministry of Ecology, Sustainable Development and Energy on renewable energy.
	Agreement with the French Development Agency (Agence Française de Développement, or AFD) to raise low-cost debt finance for both utility scale and rooftop solar power projects.
India - Belgium	NISE (National Institute of Solar Energy), an autonomous entity under the new and renewable energy ministry and the Tiger Power of Belgium signed a MoU for the validation of technology that combines solar panels, normal lead-acid batteries and hydrogen fuel cells to produce steady power. ¹⁹

Table 1.1.4: International Co-operation

II Europe

Buildings are responsible for 40% of energy consumption and 36% of CO₂ emissions in the EU. While new buildings generally need fewer than three to five litres of heating oil per square meter per year, older buildings consume about 25 litres on average.

Currently, about 35% of the EU's buildings are over 50 years old. By improving the energy efficiency of buildings, it is estimated that the EU could reduce energy consumption by 5-6% and lower CO₂ emissions by about 5%.

While individual member states started regulating their building sector for energy efficiency from the mid-1970's, Directive 2002/91/EC or Directive on the Energy Performance of Buildings (EPBD) of the European Parliament and Council on energy efficiency of buildings was the first concerted action by the EU on energy efficient buildings.¹

Under the existing Energy Performance of Buildings Directive (2010) member states are mandated to

achieve the following through national legislations and policies:

- Energy performance certificates are to be included in all advertisements for the sale or rent of buildings
- Establish inspection schemes for heating and air conditioning systems or put in place equivalent measures
- All new buildings must be nearly zero energy buildings by 31 December 2020 (public buildings by 31 December 2018)
- Set minimum energy performance requirements for new buildings, for major renovation work of buildings, and for the replacement or retrofit of building elements (heating and cooling systems, roofs, walls and so on)
- Draw up lists of national financial measures to improve the energy efficiency of buildings

Another concerted action is the European Union policy on energy efficiency. The current policy which is the Energy Efficiency Directive 2012/27/EU (EED)² mandates the member states to:

- Make energy efficient renovations for at least 3% of the buildings owned and occupied by the central government
- Only purchase buildings which are highly energy efficient
- Draw-up long-term national building renovation strategies which can be included in their National Energy Efficiency Action Plans

Member states are expected to formulate national laws, policies and programmes within this broader framework. The national level laws and regulations are supported by regional and local governments who set and mandate binding targets. Although the rating systems, financial structures and subsidy regimes differ among the member states, the mandatory provisions and targets have to be invariably achieved.

In the following sections, the context, the implementation regime, the energy performance requirements, the incentive structure and the negative reinforcements in the form of penalties of select member states are presented along with the chronology of important legislations enacted. This is followed by a summary of the schemes and approaches adopted by select cities in those member states.

2.1 Germany

From 2014 to 2016 about 3860 GWh of energy savings has been achieved through efficiency improvements in heating systems. In 2014 about 10 % of building stock displayed EPC certificates as mandated by the Energy Performance of Building Directive.

Background

Building level energy efficiency has been a legal requirement in Germany since 1976 when, in the wake of the first energy crisis, the Energy Saving Act was adopted by the German parliament. As a signatory of the Energy Performance Building Directive, Germany has embarked upon an integrated approach to energy savings in buildings by embedding performance requirements in laws and building codes. Laws such as the German Energy Saving Act 2009, the German Renewable Energies Heat Act 2009, etc are examples.

Implementation

The federal government makes energy saving laws in consultation with the regional governments. The regional governments enact building codes, local laws for energy savings and enforce national laws. The 16 local governments are in charge of the energy control

system and the general enforcement of building energy performance certification. However, the overall administration is run by DIBt (Deutsches Institut für Bautechnik), a common authority for nationwide issues of building control.

Energy Performance Requirements

Germany follows an integrated approach to measure energy performance of buildings by accounting for all components of a building through a comparative methodology. The maximum primary energy to be consumed by new residential buildings is pegged against a standard reference building and old buildings against their 2009 energy consumption.

Residential (New)	75% of referenced building
Residential (Old)	140% improvement over 2009 level

Table 1.2.1: Primary Energy Requirement – Germany¹

Financing and Incentives

Germany has been a pioneer in green financing and uses a mix of conventional and innovative mechanisms to finance its green building initiatives. KfW Förderbank advances low-interest loans to developers and individuals for construction and retrofitting of green residences. Siemens Financial Services supports investments in the sector through its environmental portfolio. Federal & regional governments also extend direct support. Crowd-funding platforms such as the EcoCrowd backed by the German Environmental Foundation, finance construction of green buildings.⁵

Under German law relating to apartment leases, landlords are entitled to raise the rent if they carry out measures to increase energy efficiency. The annual rent may be increased up to 11 percent of the modernisation costs.

Penalties

Display of Energy Performance Certificate (EPC) during sale/rent is mandatory by law. Specialised legal professionals observe the market on behalf of their client and bring to the notice of the authorities, a competitor who fails to display the notice. This warning notice entails a significant fee for the lawyer and compensation for the competitor.

Year	Law
1976	Energy Savings Act
1990's	Ordinances on Insulation and Heating
2009	German Renewable Energies Heat Act
	German Energy Saving Act
	German Heating Costs Ordinance

Table 1.2.2: Chronology of Legislation – Germany⁴

2.2 Belgium

From 2010 to 2015 about 6% in heating and 5-10% reduction in cooling systems were saved by efficiency improvements. By 2014, 25% of the residential building stock was converted to green stock.

Background

The first Energy Performance Directive dates back to 2007 and was later modified in 2009. In 2013 it was replaced by the ordinance on the Brussels Air, Climate and Energy Code (COBRACE), which reorganises and integrates Brussels' legislation in the areas of air, climate and energy. Energy performance requirements have been mandatory for buildings for which a building permit has been mandated since July 2008.

Implementation

In the Brussels Capital Region, the EPBD is under the combined responsibility of the Regional Minister of Energy and the Regional Minister of Environment.

Energy Performance Requirements

Energy performance requirements are on primary energy consumption, insulation level, ventilation rate, overheating, technical installation, etc., and are different for new buildings, major or minor retrofits, and existing buildings. The net energy requirements for various types of buildings are codified along with the component wise specifications.

Airtightness, ventilation, thermal bridges and other technical installations are also taken into account. The requirements are classified into 'whole building requirements' and 'component' requirements. The former is concerned with the total primary energy consumption, and the latter is concerned with net heating, for all new construction permit requests. The requirements set for 2015 should reduce primary energy consumption of buildings constructed between 2011 and 2014 by an additional 60%.

Brussels region has also embarked upon the trajectory of converting its building inventory into Near Zero Energy Buildings by 2021 and has brought suitable changes in the CORBRACE Act to mandate tighter standards.

Residential (new)	45 kWh/sqm/year
Residential (units considered new-over 75% change in the envelope and replacement of the technical installations, in order to encourage renovations and not demolitions)	Same as above with 20% leverage in all conditions

Table 1.2.3: Primary Energy Requirement – Belgium¹

Financing and Incentives

On the federal level, the allowable deduction of company profits for investments is greater for energy-efficient investments. Companies which have concluded audit or benchmarking contracts with the regional government, can enjoy tax reductions on acquisitions of energy savings. On the regional level, financial benefits increase when energy efficiency increases (e.g., BEN-category of “almost-energy-neutral-buildings”).⁶

Penalties

If the procedures specified in the regulations are not performed, the owner of a facility is subject to criminal penalties.

Year	Law
2007	Belgium Brussels - Ordinance on energy performance and indoor climate of buildings
2011	Order of Brussels-Capital Government on the PEB requirements applicable to heating systems
2013	COBRACE ordinance

Table 1.2.4: Chronology of Legislations – Belgium⁴

2.3 Finland

From 2010 to 2015 about 330 – 650 GWh and 6.5 - 17.8 GWh were saved annually by efficiency improvements in heating and cooling systems respectively. At the end of 2013, the 17,600 EPC's issued represented 1.2% of the building stock

Background

Finland has had building energy efficiency regulations in the National Building Code since 1976. These regulations have been tightened several times, among others due to the implementation of the EPBD. Energy Performance Certificates (EPC) were introduced at the beginning of 2008, based on the Energy Certification of Buildings Act.

Implementation

The Ministry of the Environment is responsible for the transposition and implementation of the Energy Performance Building Directive (EPBD). The regulatory regime focuses less on developing a set of requirements and instead seeks ways to initiate energy efficiency improvements to be enforced during planned and corrective maintenance. This involves innovative means related to decision making, services and financing of renovations, which are initiated through communication measures, as well as training and improving the know-how of building professionals through voluntary schemes.

Energy Performance Requirements

The current minimum performance calculations for new buildings are based on a national calculation method that follows the main principles of CEN standards. Buildings are classified on an energy scale ranging from A-G; A being the best ($E < 75$ kWh/sqm/year) and G being the worst ($E > 241$ kWh/sqm/year). The primary energy requirements are different for new residential buildings and old residential buildings that have to be retrofitted to achieve minimum energy savings.

Residential (new)	130 kWh/sqm/year
Residential (old)	Indexed to component

Table 1.2.5: Primary Energy Requirement – Finland¹

Financing and Incentives

Finnish incentives involve innovative means related to decision making, services and financing of renovations, which are initiated through communication measures, as well as training and improving the know-how of building professionals. The ministry has assigned Motiva for the coordination of a national information campaign on energy certificates since 2008.

Penalties

The building owner is responsible for ensuring that an EPC is issued for the building. As the administrative authority, the ARA initiates enforcement measures in case of negligence on the part of the building owner. Measures are administrative, not penal, and include orders, warnings, prohibitions and conditional fines. The ARA also has the right to have the EPC made, in case it is missing.

Year	Law
2013	Finnish Act on Energy Certification of Buildings (2013)
2013	Finnish Decree on Energy Certification of Buildings (2013)

Table 1.2.6: Chronology of Law – Finland⁴

2.4 France

In 2014, 20% of building stock displayed EPC certificate.

Background

France's first thermal regulations were introduced in 1975, and are being amended regularly. Two environmental laws, named "Loi Grenelle I" and "Loi Grenelle II" implementing the so-called "Grenelle de l'Environnement", were enacted in 2009 and 2010.

The main purpose of these laws was to reduce the energy consumed by buildings.

Implementation

The implementation of the Energy Performance of Buildings Directive (EPBD) is the responsibility of the French Ministries of Ecology and Housing. The National Programme for thermal regulation incentivises building owners to improve heating systems. This programme is also supported by 80 local level programmes.

The French EPC, called "Diagnostic de Performance Energétique (DPE)", was introduced in France in 2006 and is produced by a QE. For both existing and new buildings, issuing an EPC involves the QE assessing the thermal efficiency of the building following an on-site visit, where the envelope, HVAC and Domestic Hot Water (DHW) systems are inspected. Once issued, the EPC is automatically sent to the EPC national database (mandatory since 2013), and is valid for 10 years.

Energy Performance Requirements

The requirement for energy efficiency of buildings imposes a limitation on the energy demand (heating, cooling and lighting) based on the bioclimatic conception of the project, and is benchmarked to a reference value. This includes limitations on the primary energy consumed for the combined use of heating, cooling, domestic hot water, lighting and auxiliaries, that have to achieve values lower than a benchmark reference.

Financing and Incentives

France uses both public and private funding to support Green buildings. Banque Publique d'Investissement, a French public investment bank, finances renovation projects. Public aids and tax credits like Crédit d'Impôt en faveur du Développement Durable have been created to promote renovation. "Energy Transition (CITE)" is a tax benefit for the purchase of the most efficient materials and equipment in terms of energy saving and reduction of greenhouse gas emissions. VAT rate was reduced to 5.50% for energy-reduction work and repairs. The French National Agency for Habitat (Anah) and private funding initiatives also incentivise retrofitting.⁸

Penalties

In case of non-compliance there are two types of sanctions: on the civil-law side the client can demand the cancellation of the sale; on the criminal-law side, the sale can be considered as fraudulent and can lead to a prison term of two years without remission and to a EUR 37,500 fine imposed by the General Directorate of Competition, Consumption and Fraud Repression (DGCCRF).

Year	Law
2009	Law of programming relating to the implementation of the Grenelle Environment Forum
2009	Law on national commitment for the environment

Table 1.2.7: Chronology of Laws – France ⁴

2.5 Denmark

In 2014, 29% of building stock displayed EPC certificate.

Background

Energy performance requirements for new residential and non-residential buildings were implemented in the Danish Building Regulation in 2006. In 2012 a National Energy Agreement was approved by a broad coalition in the Danish Parliament. This launched 21 initiatives involving key stakeholders within the building renovation sector, collectively called the ‘Danish Network for Energy Retrofit’.

Implementation

In Denmark, the implementation of the EPBD is the responsibility of the Danish Energy Agency (DEA). The regulatory regime facilitates completely voluntary agreements that give developers and owners enough flexibility to achieve energy reduction and achieve overall targets.

Energy Performance Requirements

The minimum energy performance sets the limit for maximum allowed primary energy demand for a building, which includes thermal bridges, solar gains, shading, infiltration, ventilation, heat recovery, cooling, lighting (for non-residential buildings only), boiler and heat pump efficiency, electricity for operating the building, and sanctions for overheating. In addition to the minimum requirements a set of requirements for two voluntary low energy classes: ‘Low-energy Class 2015’ and ‘Building Class 2020’ (NZEB) were also introduced.

Residential (New)	30 + 1,000 / A [kWh/m ² /year]
Residential (Old)	Indexed to component

Table 2.9: Primary Energy Requirements

Residential (New)	20 [kWh/m ² /year]
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Table 1.2.8: NZEB requirements – Denmark ¹

Financing and Incentives

BedreBolig, a government-funded campaign has been launched to help building owners choose the best solutions for their renovation projects. Tax deduction for craftsmen’s fees related to renovation of buildings encourages owners to renovate (“Bolig-job ordning”). It is obligatory for energy service companies to implement energy saving measures for their customers. Reduced energy taxes have been introduced for heat pump owners over owners of other non-efficient heating systems. In new buildings, heating with oil or gas is no longer allowed, which means that district heating, heat pumps and other heating systems with high efficiency are promoted.¹⁰

Penalties

If the rules regarding the EPC are not adhered to, the building owner, real estate agent, etc., may face fines and further liability. The amount of fine for not having an EPC or for violating the EPC rules, corresponds to the size of the building. Along with the fine, the owner may also face an injunction from the Danish Energy Agency to display the EPC or to have an EPC issued.

Year	Law
2007	Danish Executive Order on inspection of ventilation and AC systems in buildings
2010	Danish Building Regulations 2010 (BR10): Executive Order
2012	Danish Executive Order on the promotion of energy savings in buildings

Table 1.2.9: Chronology of Legislations – Denmark ⁴

2.6 Italy

From 2010 to 2014 about 9000 GWhr and 1,900,000 tonnes of CO₂ were saved annually. At the end of 2013, 13% of the building stock displayed EPC.

Background

While the first legislation on energy savings of buildings was enacted in 1991, the first decree that set the basis for the national legislative EPBD framework was enacted in 2005. This was followed by legislations in 2012, 2013 and 2015 to improve the energy performance of buildings.

Implementation

Energy-related topics are shared between the state and the 21 regions and autonomous provinces. Consequently, regional authorities may implement autonomous transpositions of the EPBD, as long

as they do not contradict the general principles and requirements provided by national and EU regulations. The national regulation stays in force for the regions that have not issued their own legislation. The National Agency for Energy and Environment (ENEA) is evaluating implementation measures and is strategising potential national energy savings attained through regulations and incentives.¹¹

Energy Performance Requirements

The calculation methodologies are based on national standards derived from CEN. The minimum performance requirements will also include thermal performance and transmittance indices, as well as overall energy performance indices, expressed both in terms of total primary energy and non-renewable primary energy use.

Residential (New)	Based on climatic region and component wise split
Retrofitting	Same

Table 1.2.10: Primary Energy Requirements – Italy¹

Financing and Incentives

The Italian National Action Plan for Renewable Energy provides tenders to award capital account contributions promoting renewable sources. Small and Medium Enterprises (SMEs) commit to energy efficiency projects supported by a fund provided by the European Investment Agency. Banks offer businesses and households energy-efficiency loans

Penalties

The person in charge of the installation (owner or tenant of the property, or the administrator of the building) failing to follow the maintenance schedule laid down in the decree for the maintenance and control of the thermal efficiency of the heating system can be levied a penalty of between EUR 500 and 3,000. Similarly, any company not performing the assigned maintenance and inspection services will be levied a fine of between EUR 1,000 and 6,000. The regional government is required to report any violation to the chamber of commerce for appropriate disciplinary measures. Failure to perform maintenance and testing of energy efficiency of the heating system with the minimum frequency required by law voids the validity of the EPC of the building or the housing unit.

Year	Law
2005	Legislation on EPBD
2012	Thermal Energy Act
2013	Legislation on EPBD

Table 1.2.11: Chronology of Legislations – Italy⁴

2.7 Spain

At the end of 2014, 5.9% of the building stock displayed EPC.

Background

Spain began to implement the energy certification of buildings in 2002, through different methodologies already in existence for the energy evaluation of newly constructed buildings.

Implementation

In Spain, responsibility for the Energy Performance of Buildings Directive (EPBD) lies with the Ministry of Industry, Energy and Tourism, the Ministry of Public Works and Transport, and regional administrations. A national strategy to project various outcomes in different situations and the appropriate tools to be used is developed by Ministry of Finance & Public Administration.

Energy Performance Requirements

In 2007, the official LIDER/CALENER¹⁴ tool was developed to certify buildings based on the Technical code. The Technical Code for Construction (Codigo Technico Edificación) and Regulation of Thermal Installations in Buildings was enacted to address technical issues related to heating and cooling systems. The LIDER enabled rating system stipulates the minimum primary energy requirements for buildings.

Financing and Incentives

While there are no private green financing initiatives for sustainable real estate projects, banks finance only exclusive renewable energy projects. While there are no incentives for efficient long term investments, National Energy Efficiency Fund and the Institute for Energy Diversification and Savings (IDAE) have funding instruments that support projects and businesses investing in renewable energy and energy saving projects. The Fondo JESSICA-F.I.D.A.E fund invests in energy efficiency and renewable energy projects. PAREER-CRECE Programme focuses on the energy rehabilitation of residential buildings¹³ and Biomcasa II Programme invests in thermal biomass projects in buildings.¹⁴

Penalties

In Spain, the building owners are obligated to provide information on the building's energy efficiency before any sale or rental agreement is signed. The role of the regions, as well as notaries, is to ensure compliance with the requirements. Penalties are enforced on non-compliance.

Year	Law
2006	Spanish Technical Building Code - Royal Decree
2007	Spanish Thermal Building Regulations - Royal Decree
2013	Spanish Thermal Building Regulations - Royal Decree
2013	Spanish Energy Certification of Buildings - Royal Decree
2013	Spanish Technical Building Code - Order

Table 1.2.12: Chronology of Laws – Spain⁴

2.8 Norway

By 2015, 20% of the building stock in Norway displayed EPC.

Background

While the Energy Performance Buildings Directive 2002 is implemented in Norway, the EPBD 2010 is not implemented as it has not been formally included in the Agreement in the European Economic Area (EEA). In 2012, a broad agreement in the Parliament stated that all new buildings should be at the “Passive House” level in 2015, and should be Near Zero-Energy Buildings (NZEB) by 2020.

Implementation

The scheme for the certification of buildings is the responsibility of the Ministry of Petroleum and Energy. The Norwegian Water Resources and Energy Directorate (NVE) is the managing body for certification and inspection schemes. Enova, a public enterprise owned by the Ministry of Petroleum and Energy took over the management of the certification and inspection schemes from 1 July 2016. The National Office of Building Technology and Administration is another important institution involved in the implementation of energy efficiency in buildings.¹⁵

Energy Performance Requirements

All new buildings are required to be audited by an independent expert at the end of the construction process. For larger residential buildings and for non-residential buildings, the audit will be more extensive than for single-family houses. Air leakage testing is mandatory for all building types and must be documented to the current standard.

Residential (Apartment)	Minimum primary energy	95 kWh/sqm/year
	Air Tightness	1.5 air changes/hour @ 50Pa difference
	Solar Energy	No fossil fuel based heating When electricity is produced on the property (more than 20 kWh/m ² /year), the energy limit can be exceeded 10 kWh/sqm/year

Table 1.2.13: Energy Requirements – Norway¹

Financing and Incentives

In 2013, more than 1 million sqm of passive houses and 400,000 sqm of low energy buildings were built with support from the national programme for passive and low energy buildings. As this made up for less than 10% of the new building stock the program was therefore discontinued and replaced by another programme for even more ambitious projects, such as the NZEB.

Penalties

In practice, the use of penalties is difficult when it comes to residential properties. Therefore, the buyer or the lessee of a house or apartment has been given the right to order an expert certificate at the seller's or lessor's cost if an EPC is not shown according to the regulation.

Year	Law
2009	Norwegian Regulation for Energy Certification of Buildings
2011	Norwegian Technical Regulation for New and Renovated Buildings

Table 1.2.14: Chronology of laws – Norway

2.9 Brussels

In Brussels, the building sector is responsible for over 70% of the energy consumption and 63% of CO₂ emissions, almost 40% of NO_x emissions and almost 25% of particulate emissions in the region. In signing the Covenant of Mayors, Brussels with 1,600 other signatory cities, has committed to reduce its greenhouse gas emissions by 30% by 2025, thus exceeding the European objective of a 20% reduction in 2020.²¹

Policy Objectives

- To reduce the energy consumption in existing buildings by making them passive buildings
- To mandate new buildings to be passive and incentivise them to move towards exemplary buildings

Rating and Metrics

The following are four simple requirements for Exemplary Buildings (BatEx):²²

- Projects must be very economical in energy, with the passive standard as a reference for new constructions and the low and very low energy standard for renovation projects.
- Projects must favour eco-design in their preference for sustainable materials, must respect natural cycles (the rainwater cycle, in particular) and biodiversity, must have hygienic spaces, must adapt eco-mobility forms, etc.
- Projects must have high architectural quality, good visibility and should be well integrated into the existing building stock.
- Projects must be simple and scalable in concept and material from the technical and financial perspective with acceptable pay-back times.

The 'Eco-dynamic Company' label is granted to businesses that develop measures that support sustainable management. The label takes into account various aspects such as: the management of energy, waste, travel, interior air quality, noise reduction, etc. This label expresses the determination of these businesses and organisations to take an innovative approach in the long term.

Institutions

The Professional Reference Centre for Construction

The professional reference centre for construction is involved with the capacity building of low skilled labour. It aims to develop eco-construction and renewable energy trades to improve the employment potential of low-qualified workers.

The Brussels Regional Housing Authority (SLRB)

The SLRB is in charge of low-cost housing. Local companies, under the umbrella of Public Service Housing Companies (SISP), are under its supervision. The SLRB aims to reduce the cost of occupying housing, i.e. the sum of the rent and the energy charges. It has made sustainability a primary goal in its strategic plan for 2010-14.

The Brussels Regional Development Agency (SDRB)

The SDRB is active in the areas of economic expansion and urban renovation. Through public-private partnerships, it develops housing for residents with moderate incomes, in neighbourhoods characterised by a shortage of residential projects to ensure that residents remain in the region. The SDRB is responsible for building and marketing the first passive apartment building in the Brussels Capital Region. This created awareness amongst buyers on passive housing projects with the specific features and facilities.

The Passive House Platform

This is an independent organisation supported by the government to guide project sponsors. It also handles the technical evaluations of passive constructions, low and very low energy renovation projects for subsidies.

The Eco-Build Cluster

The government has entrusted the Brussels Enterprise Agency (BEA) with the creation of an eco-construction cluster in Brussels. Its aim is to develop the sector as a solution for sustainable construction and renovation. The cluster networks businesses active in the area and plays an interfacing role for them.

Subsidies

Two sets of complimentary approaches to subsidies are used – a) 'Energy' subsidies for individuals, the housing sector, the industrial and tertiary sectors and b) specialised training subsidies to move towards new sustainable systems and technology.

A specific aid supports new construction to meet the passive standard (heating demand ≤ 15 kWh/sqm/year) and renovation to meet the low energy level (heating demand ≤ 60 kWh/sqm/year) or very low energy level (heating demand ≤ 30 kWh/sqm/year).

Business and Employment

Businesses are getting involved aggressively due to active policies that have a positive economic effect. In addition to stimulating demand, the market for construction professionals has been revitalised through

the use of new materials, new training and new trades. The Region also encourages the development of trials and experimentation, contributing to the facilitation of innovations in the building sector.

Impact

Economic Impact

While generating a EUR 319 million turnover in three years, the exemplary buildings operation has created approximately 1,250 jobs.

Environmental Impact

Brussels has progressed from zero passive buildings in 2007 to more than 80,000 sqm built or planned in 2009. In 2015, the passive standard was made mandatory for all new constructions. Exemplary buildings avoid emission of over 13,000 tonnes of CO₂.

2.10 Oslo

Heating of buildings accounted for 35% of Oslo's GHG emissions in 2011 and the city plans to reduce that to zero by 2020 aiming to become the world's leading sustainable city. It has set ambitious goals: fossil-free citywide heating and public transport by 2020, 50% citywide greenhouse gas reductions by 2030 from a 1990 baseline, and carbon neutrality by 2050.²⁴

Programmes

Urban Ecology Programme, 2011 – 2026

It is the umbrella programme through which Oslo city administration aims to become the most environment-friendly city.

Target 3

Urban development in Oslo will be sustainable, with an environmentally sound built environment and urban spaces that have specific sub-targets that deal with green buildings and sustainable housing.

FutureBuilt

FutureBuilt is a collaborative effort involving a number of central government agencies and various architecture firms and construction companies. The 10-year program (2010-2020) aims to complete 50 pilot projects consisting of urban areas as well as individual buildings with the lowest possible greenhouse gas emissions.²⁵

The Oslo Climate and Energy Fund

It was developed to stimulate energy savings and facilitate the transition from fossil fuels to renewable energy, specifically in the building sector. In 2011 alone, grants totalling an impressive NOK 50 million (USD 9 million) were awarded to over 3,000 climate and energy efficiency projects.

Rating and Metrics

Oslo aims to promote eco-efficient urban development in accordance with the principles of urban ecology by documenting area that has been acquired for green construction. It uses both regulatory and economic instruments to achieve permanent reductions in energy use, including phasing out of all oil-fired heating by 2020. All buildings in Oslo that are rented in the private market must as a general rule satisfy low-energy standards from 2015 and passive house or equivalent standards from 2020.

The new buildings under FutureBuilt must meet the minimum near zero, zero or plus energy level criteria. For renovation projects the energy requirements are more flexible, so that the low-energy standard combined with the use of passive components may be sufficient.

Economic and Regulatory Aspects

Grant and loan schemes from Oslo's Climate and Energy Fund for energy-effective new buildings, energy-effective renovation projects and energy efficiency measures in existing buildings are straightforward, predictable and based on clear criteria.

Grants and/or concessional loans and exemption from processing fees is offered to developers whose plans satisfy or exceed passive house standards.

Business

A definite dialogue and cooperation forum has been established between the city administration and businesses to promote sustainable buildings. All city districts are mandated to have Local Agenda 21 forums where local targets are decided and implemented. These forums require the participation of businesses.

Impact

Oil heating has already been phased out in municipal buildings, and from 2014 all new municipal buildings must be passive. To achieve the same conversion in private buildings, the city has planned to build a fossil-free district heating system by 2016. It offers grants for conversion of private buildings from oil heating to renewable energy, through means such as fossil-free district heating, heat pumps and bio-energy systems. Since 2007, a thousand private oil-fired boilers have been replaced by heat pumps.

2.11 Stockholm

Residential buildings alone account for 35% of the energy consumption in the city, and reducing their energy needs can yield a significant improvement in the urban GHG emissions. The goal of the city of Stockholm was to lower its CO₂ emissions to three tons per capita by 2015.²⁷

Background

In 1965 the Swedish Riksdag resolved to overcome the severe housing shortage and raise housing standards by building at least a million new homes in 10 years. The programme mostly involved flats, but terrace housing and detached houses were also included. Homes from the Million Homes Programme constitute one third of Sweden's present building stock. There are more than 200 million Europeans living in similar areas. Many of these buildings are now in need of renovation and at the same time require energy efficiency improvements.

Targets

- To halve energy consumption from 188 kWh/sqm/year to 90 kWh/sqm/year in 350 apartments owned by Stockholm's public housing authority.
- To use national funding to implement a pilot project that will be directly rolled-out into a more widespread green retrofit plan for 5,600 apartments in the surrounding area.

Programmes

Sustainable Jarva

Using a national grant, the city is in the process of retrofitting 350 apartments with energy improvements that comprise new facades, solar PV, and lighting, together with interior and exterior upgrades. Not only will the energy demand be reduced from an average of 188 kWh/sqm/year to 90 kWh/sqm/year, but also the pilot project will be expanded to 5,600 surrounding apartments by 2022. It is being done in a socially prudent manner, with residents being provided alternative housing during the retrofit. Additional community planning actions are being undertaken to support more sustainable energy use and mobility.

Impact

The impact of Stockholm's retrofitting programme is yet to be determined.

2.12 Copenhagen

Copenhagen seeks to reform its current urban structures towards smarter energy use. It aims to become

the first carbon neutral city by 2025. The targets for the building sector are:

- A 40 % reduction in the energy consumption in buildings (compared to 2010)
- A decrease of 10% of its electricity usage and 20% of its heat consumption through retrofitting
- All new buildings are to meet the updated classifications
- 60,000 sqm of solar panels are to be installed on municipal buildings

In addition to this, green roof gardens and solar cells are to be encouraged. Advanced monitoring technology is also being implemented, where buildings are equipped with visual monitors of the overall water and energy flow throughout the structure.²⁷

Policies

The CPH 2025 Climate Plan

The new and holistic CPH 2025 Climate Plan intends to collect and specify goals and initiatives in four areas – energy consumption, energy production, mobility and city administration. Under the city administration climate initiatives, a major focus will be directed to building low energy and climate adaptable buildings, through collaboration with knowledge institutions, private and public players to create and disseminate new knowledge on solutions for energy retrofitting, new climate adaptable buildings and user behaviour.²⁸

In this context, it is expected that the city public buildings would comply with the following initiatives:

- Development of building environmental management and maintenance systems
- Embracing a climate focus on all renovation projects for municipal buildings
- Implementation of low energy construction principles
- Fulfillment of energy conservation criteria for all municipality rentals
- Establishment of an energy fund to finance upcoming projects
- Training programs on CO₂ reduction opportunities for building owners, lessors, trade workers and consultants
- "Hotmapping" function on the municipality's homepage for inhabitants and businesses to gain perspective on their building heat losses
- Establishment of dialogue sessions between the municipality and businesses about energy conservation measures and economic benefits
- Release dialogue sessions with the national and regional governments about energy upgrades of their buildings in Copenhagen

- The municipality is to contribute towards establishing and developing solar cell solutions through partnerships and a heightened information campaign
- Systematic audits and energy consumption recording, as well as energy management through environmentally correct operations
- Inclusion of long-term energy saving measures in major retrofitting and refurbishment projects
- The municipal buildings constructed by 2015 should follow the requirements of the 2015 classification, while those built by 2020 should follow the 2020 classification
- 30,000 sqm of solar panels to be installed on both existing and new municipal buildings

The referenced set of measures intends to achieve a national energy labelling scheme for public buildings subjected to an energy efficiency upgrading. Through an agreement established between the Danish local government association (Local Government Denmark) and the national government, all climate upgrade projects with less than a five-year payback period would be completed within five years of receiving the energy label. In the case of Copenhagen municipal buildings, this period and payback could be extended and recovered up to a period of 10 years. Also in the energy consumption front, the immense potential of building energy efficiency is addressed as an important contribution to the city's energy reduction initiatives. These initiatives are planned to prepare both the existing and new buildings for new demanding regulations. In order to improve building structures and conditions, procedures, guidelines and funds have been instituted to increase climate retrofitting and the establishment of partnerships for the development of private lighthouse projects.

2.13 London

Background

Like most EU countries, the United Kingdom had also embarked upon energy efficient buildings beginning in the last century. In the 2000's the new directives launched, defined an internal energy market through a building construction legislative framework with directives, principles, procedures and deadlines that were established in a clear, consistent and comprehensive manner. The revised EPBD in 2010 set considerably more stringent targets, requiring the UK to reduce CO₂ emissions by 80% by 2050. For its part the city has set out a target to reduce CO₂ emissions by 60% from the 1990 levels, by 2025. In order to achieve such an ambitious target the city of London has adopted a host of measures to achieve energy efficiency in the building sector.

Rating System

The revised and updated Building Research Establishment's Environment Assessment Method, 2014 (BREEAM), is the most commonly used building rating tool in the UK.

Programmes

RE: FIT programme

Established by the Greater London Authority (GLA), this is a building retrofitting scheme to support public sector organisations to reduce their carbon footprint and their subsequent energy bills. The central focus of the scheme is to reduce CO₂ emissions.³⁰

Water and Sewage

With respect to water in the city, the GLA is working with the four water providers (Thames Water, Affinity Water, Essex and Suffolk Water and Sutton and East Surrey Water) to introduce a Universal Water Metering System. Currently Londoners pay less for their water services in comparison to many other areas in the UK, as they pay a fixed charge for their water and sewerage services.

RE: NEW programme

The Greater London Authority (GLA) offers in-house advice and education services. It has been designed to allow every home, regardless of tenure or housing type, to benefit from measures to help them reduce energy bills and energy wastage. A package of easy measures is installed in each household by a trained energy advisor who explains how the customer can make changes to reduce waste of energy and water. At the end of the visit the advisor produces a personalised report for each property as an output.³¹

Waste Management

In the area of waste management, 'Recycling Saves Money Campaign', 'Waste Reduction Campaign', 'Community Composting' and 'Business Waste Recycling Collection Services' are a few initiatives that have paid rich dividends.

Impact

Economic Impact: The waste management initiatives alone save GBP 30.5 million/year.

Environment Impact: The RE: FIT programme has retrofitted 257 of London's public sector buildings in 28 London boroughs. The target is for 40% of the public sector buildings to be retrofitted by 2025; if achieved, this would reduce carbon emissions by over 2.5 million tonnes/annum.

III East Asia & Australia

3.1 Japan

Background

Japan's regulation of building energy efficiency falls under the Energy Conservation Law that was first adopted in 1979. There are separate regulations for 'buildings', i.e., commercial buildings, and 'houses', i.e., residential buildings. Beyond regulations, Japan has also fostered a number of non-regulatory programmes to promote building energy efficiency, such as the establishment of the Energy Conservation Centre of Japan (ECCJ), the CASBEE rating system for green buildings, and a four-level ranking system for housing performance.¹

Implementation

The Ministry of Land, Infrastructure and Transport (MLIT) is responsible for developing the building energy standards in Japan. MLIT was established in 2001 through the consolidation of the former Ministry of Construction, Ministry of Transportation, National Land Agency, and the Hokkaido Development Agency. However, the adoption of the standards is the joint responsibility of the MLIT and the Ministry of Economy. In addition, the Energy Conservation Centre of Japan (ECCJ), which is a non-government organisation, actively provides technical assistance in energy-efficient building construction and operations.

Energy Performance Requirements

The residential building energy standard, 'Design and Construction Guidelines on the Rationalisation of Energy Use for Houses', has both a prescriptive and a performance option linked to the six climatic regions of Japan. In addition to these heat transfer and insulation requirements, there are also requirements for the addition of air barriers, heat transfer coefficient considerations for doors, and the 'summer insulation entry rate', i.e., summer Solar Heat Gain Coefficients (SHGC) considerations for windows.

Area Classification	Standard annual heating and cooling load (unit: MJ/cum/year)
I	390
II	390
III	460
IV	460
V	350
VI	290

Table 1.3.1: Primary Energy Requirements – Japan ²

Financing and Incentives

The Japan Finance Corporation provides low interest loans of up to JPY 720 million (approximately USD 7.2 million) to support energy efficiency improvements in both existing and new commercial buildings. To further promote energy-efficient products, an energy-efficient product retailer assessment system was introduced in 2003 to give recognition to retailers who actively promote energy-efficient products. Many local governments have provided incentives for buildings with a high rating on the CASBEE system. These incentives include subsidies, access to lower interest mortgages and permission to increase the floor-area ratio. The New Energy and Industrial Technology Development Organisation (NEDO) currently provides subsidies for energy efficiency improvements in residential buildings.³

Year	Law
1979	Energy Conservation Law
2000	The Housing Quality Assurance Law

Table 1.3.2: Chronology of Legislations – Japan

3.2 Singapore

Background

With an area of 719 sqkm and a population of 5.5 million, Singapore has a high per capita electricity consumption and is disadvantaged in developing alternate energy forms. In this context, it has set a target of greening 80% of its buildings by 2030. Singapore enacted the Building Control (Environmental Sustainability Measures for New Buildings) Regulations in 2008 and Building Control (Environmental Sustainability Measures for Existing Buildings) Regulations in 2013 that mandates all new buildings to meet the minimum standards and existing buildings with cooling systems to meet the same.³

Implementation

The Ministry of Environment and Water Resources with the Building and Construction Authority (BCA) implement the Green Mark Certification for buildings. The National Environment Agency (NEA) implements provisions related to the prevention of air and water pollution.

Energy Performance Requirements

The BCA Green Mark is a benchmarking scheme which incorporates internationally recognised best practices in environmental design and performance. The BCA Green Mark Scheme covers various areas of environmental sustainability including energy and water efficiency, environmental protection and indoor environmental quality.

Financing and Incentives

The Green Mark Incentive Scheme for new buildings (Gross Floor Area GFA >2000 sqm) for Gold or higher standard has fully committed SGD 20 million to developers. The Building Retrofit Energy Efficiency Financing scheme (BREEF), is a SGD 50 million Green Mark linked incentive Scheme for existing buildings and premises. Green Mark Gross Floor Area (GM GFA) is an incentive grant scheme for both new and existing developments that achieve either a Green Mark Platinum or a Gold Plus rating with additional GFA over and above the Master Plan Gross Plot Ratio control. The Green Mark Incentive Scheme for Design Prototypes is a cash incentive to encourage developers and building owners to achieve greater energy efficiency in buildings by placing more emphasis at the design stage through the engagement of Environmentally Sustainable Design (ESD) consultants to conduct collaborative design workshops and assist in simulation studies early on in the project. The Pilot Building Retrofit Energy Efficiency Financing scheme (BREEF) aims to help building owners with high upfront capital that is required for energy efficient (EE) retrofits.^{7,8,9}

Year	Law
2008	Building Control (Environmental Sustainability Measures for New Building) Regulations
2013	Building Control (Environmental Sustainability Measures for Existing Building) Regulations

Table 1.3.3: Chronology of Legislations – Singapore

3.3 Korea

Background

66% of Korea's buildings are residential buildings, of which 58% are apartments. Korea has committed to reduce 37% of its energy consumption in the building sector by 2030. It has embarked upon converting its current housing stock into passive houses by 2017 and evolving them into zero energy houses by 2025.¹⁰

Implementation

Korea's Ministry of Land, Infrastructure and Transport and the Ministry of Environment are primary institutions that conceptualised and implemented the G-SEED (Green Standard for Energy and Environmental Design) building rating system that corresponds to various building types.

Energy Performance Requirements

The rating system measures the performance of the building in nine categories, namely land use and transportation, energy and pollution, materials and resources, water, management, ecology and indoor environment quality. Credits are awarded in every category and sectional weightage is assigned to arrive at a composite score.

City	Passive Energy Requirement: U value (W/sqm)
Seoul	1.0
Busan	1.0-1.5
Jeju	1.5-2.0

Table 1.3.4: Primary Energy Requirements – Korea¹¹

Financing and Incentives

G-SEED rated building owners benefit from a reduction of property registration tax, property tax and environment improvement tax. The building developer gains a relaxation in building regulations, avails low interest loans as well as receives additional points in the pre-qualification criteria of public procurement. There is a relaxation in FAR, height restriction and landscape area ratio that can be availed, if the project satisfies a stipulated energy performance index.

The other incentives that can be availed are through schemes such as the High Efficiency Equipment Certification Programme, the Energy Efficiency Standard and Labelling Programme and the Eco-Labelling Programme.

Year	Law
1979	Rational Energy Utilization Act
2006	Energy Basic Law

Table 1.3.5: Chronology of Legislations – Korea

3.4 China

The eleventh five-year plan for the national economic and social development programme from 2006 to 2010 achieved the target of reducing the energy intensity of its GDP by 20%, achieving a 100 million tonnes of coal equivalent (tce) of annual energy savings in buildings.

During the eleventh five-year plan, 4.86 billion sqm has been built under the energy efficiency building codes.

Background

The urban residential building sector currently uses 32% of the total energy used by the building sector, which makes up approximately 20% of the total energy consumption in China. The space heating intensity alone is 16.4 kgce/sqm in northern China, while the average total energy use intensity of the whole country is 17.5 kgce/sqm. The first energy efficient building code, JGJ 26-1986 was released for cold and severe cold climatic zones in 1986 and was subsequently amended.¹³

Implementation

In China, the Ministry of Housing and Urban-Rural Development (MOHURD) supervises the formulation of building codes through the Centre of Science and Technology of Construction's 'Green Building Label' Management Office. Local authorities at the provincial or municipal level implement these national building codes by adapting them to suit the local conditions.

Energy Performance Requirements

China follows a national standard for certifying buildings. Buildings are evaluated for efficiency in land use, energy, water and material, operational management and indoor air quality. Based on the evaluation they are rated as 2- star or 3-star buildings. China is broadly classified into severe cold, hot summer and cold winter, hot summer and warm winter and temperate climatic zones based on which the standards enforced by the local authorities vary.

Financing and Incentives

The Chinese government provides rewards of CNY 45/sqm for 2-star buildings and CNY 80/sqm for 3-star ones to the builders. It aims to have 15% of the new buildings built according to the green building standards. The National Development and Reform Commission provides grants of CNY 240 from the central government and an additional grant of CNY 60-260 from the local government for each ton of coal-equivalent energy that is saved by the energy saving companies. The energy saving companies must also provide energy consulting, financing, and retrofitting services. The Ministry of Finance and State Administration of Taxation has declared a 50% added-value tax refund for the sale of energy efficient wall materials. Under the Energy Efficient Product Promotion Project (EPPPP), the government subsidises 50% of the cost of efficient lighting for residential users.

Year	Law
1986	Energy efficiency building code (JGJ 26-1986)
1997	Building Law of P.R.China
2006	National Standard Evaluation standard for green building
2012	Design code for heating ventilation and air conditioning of civil buildings

Table 1.3.6 Chronology of laws – China

3.5 Australia

Australia reports 1,456 Green Star certified projects as of 2016. As of 2015, 70% of the new houses and apartments were rated through the Nationwide House Energy Rating System (NatHERS).

Background

The building sector contributes 20% of Australia's GHG emissions. This is projected to increase by 75-150% from 2010 to 2020.

The Energy Efficiency Rating launched in 1996 was the first rating system that rated buildings between 0-10 stars and was mandatory for buildings in the Australian Capital Territory (ACT) region. This was followed by other states legislating on the subject and setting mandatory requirements on the energy performance of buildings.

Implementation

While the Department of Resources, Energy and Tourism which was subsumed by the Department of Industry is primarily responsible for the NatHERS, the state governments have their own set of requirements for building laws which are enforced by state regulatory agencies.¹⁶

Energy Performance Requirements

Australia's National Construction Code (NCC) sets energy efficiency standards for buildings. Standards for housing have increased from a 3.5-4 star minimum rating in 2003 to a 6-star minimum rating in 2010.

The NatHERS sets the methodology to estimate and rate the potential thermal performance of residential buildings on a 0-10 scale. NatHERS is administered by the Department of Environment and Energy on behalf of all the states and territories. The NatHERS rating is one of three ways by which residential buildings can achieve compliance with the NCC. Around 70% of the new houses and apartments are rated by this scheme due to the flexibility it offers builders.

Financing and Incentives

The government's energy efficiency grant programmes are stimulating investment and learning in energy efficiency across Australia, making businesses more competitive and reducing energy costs for the community. Since 2011 the Australian Government has allocated approximately AUD 197 million for 440 energy efficiency projects across its four programmes. The community energy efficiency programme is providing AUD 101 million across 160 projects to co-fund energy efficiency upgrades to local council and community facilities. The energy efficiency information grants programme provides financial support to projects for the delivery of practical energy efficiency information to businesses and community organisations. The local government energy efficiency programme provides assistance to local governments for the installation of solar and heat pump-hot water systems in community buildings and facilities. The low income energy efficiency programme is providing AUD 55 million for projects conducting trials for approaches to reduce the energy costs of low-income households.¹⁷

Year	Law
2010	Building Energy Efficiency Disclosure Act
2012	Clean Building Managed Investment Trust Act

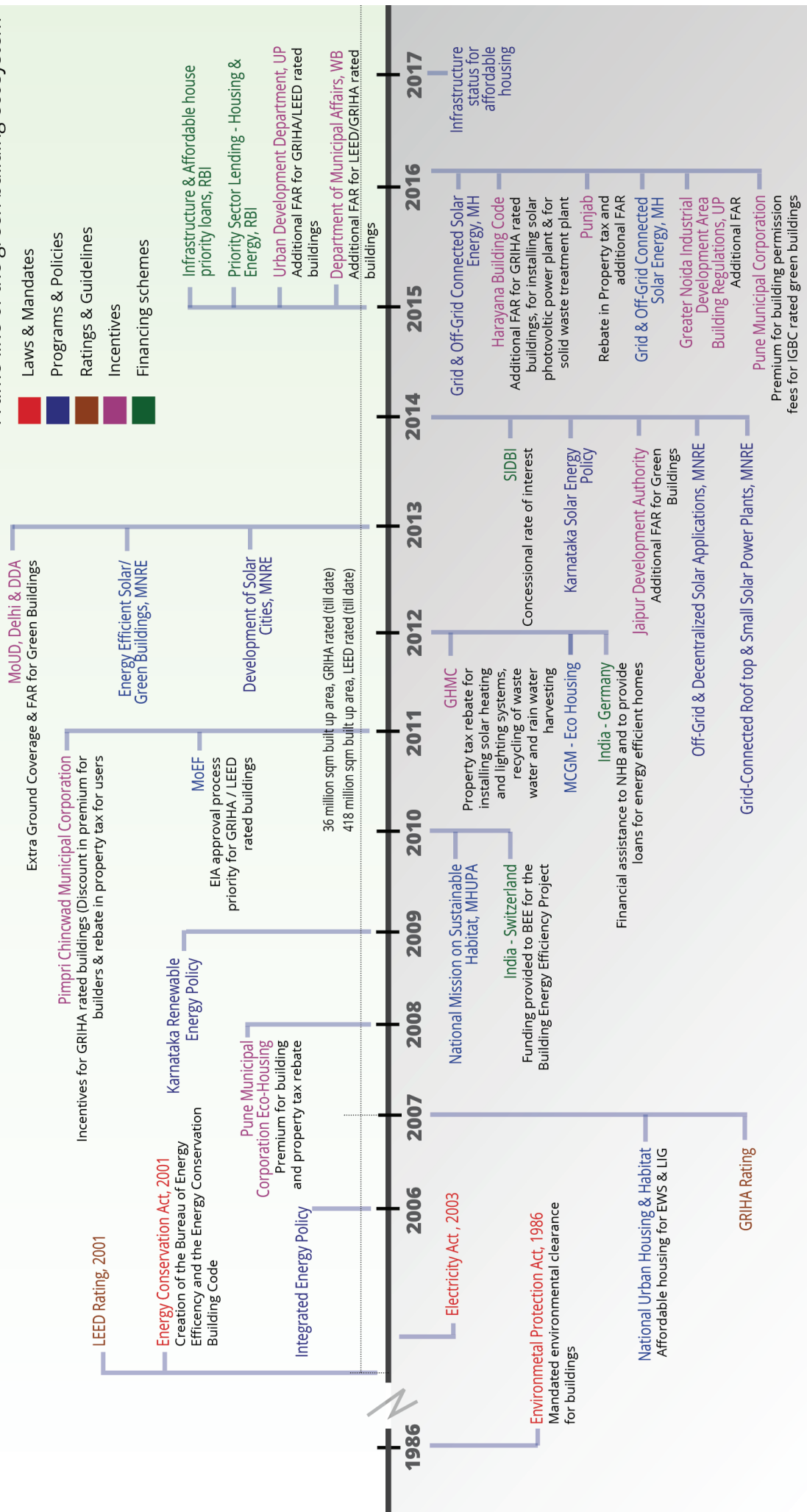
Table 1.3.7: Chronology of laws – Australia

The subsequent pages summarise and illustrate with the help of a timeline, the various policy packages implemented by India, Europe and East Asia and Australia.

INDIA

A time-line of the green building ecosystem

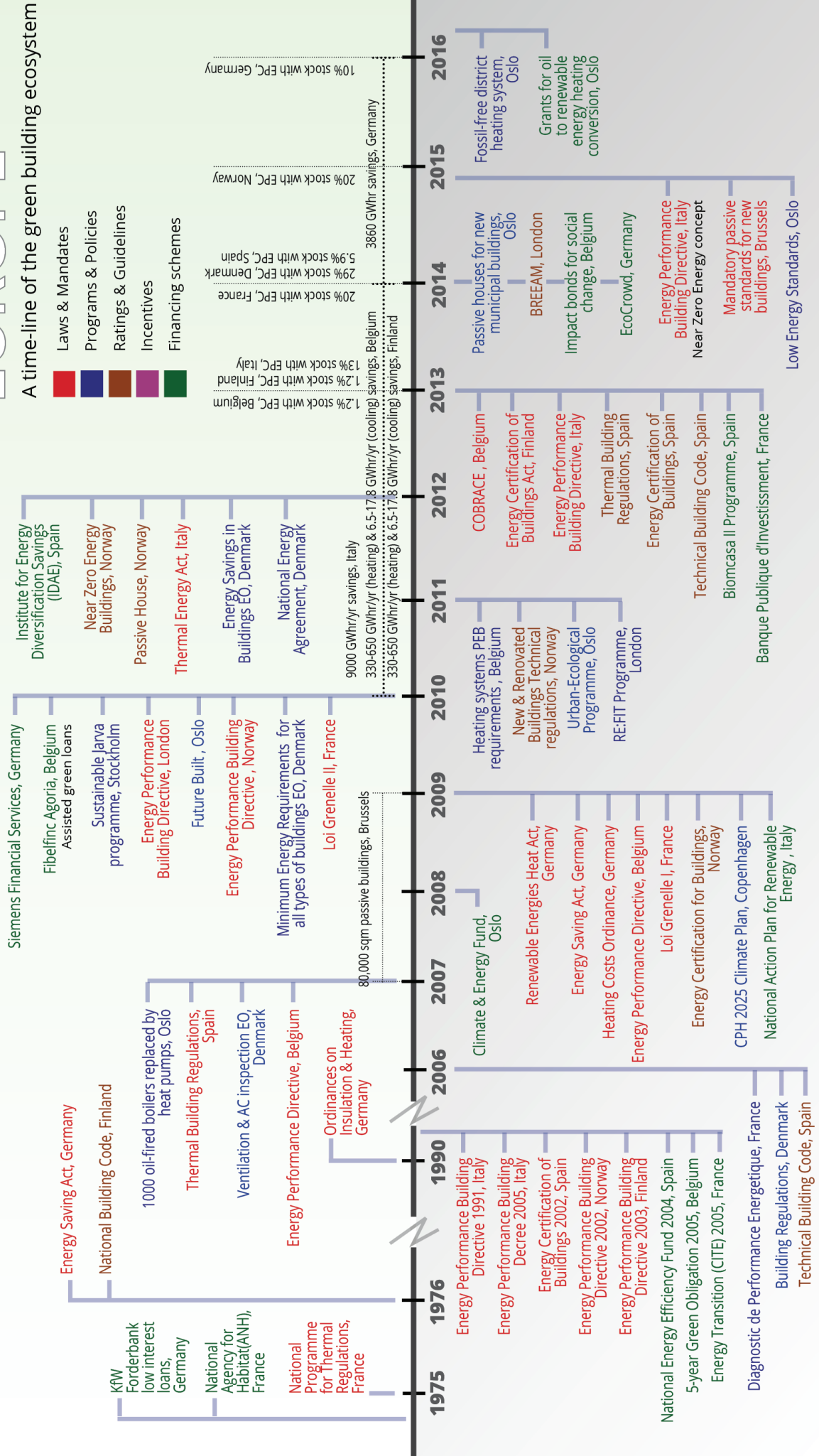
- Laws & Mandates
- Programs & Policies
- Ratings & Guidelines
- Incentives
- Financing schemes



EUROPE

A time-line of the green building ecosystem

- Laws & Mandates
- Programs & Policies
- Ratings & Guidelines
- Incentives
- Financing schemes



E.ASIA & AUSTRALIA

A time-line of the green building ecosystem

- Laws & Mandates
- Programs & Policies
- Ratings & Guidelines
- Incentives
- Financing schemes

Green Mark Incentive Scheme for Design Prototype, Singapore
 Green Mark Gross Floor Area, Singapore
 Green Mark Incentive Scheme for New Buildings, Singapore
 Green Mark Certification, Singapore

Design & Construction Guidelines on the Rationalization of Energy Use for Houses 1980, Japan

JGJ-26 1986, China

Housing Quality Assurance Law 2000, Japan

CASBEE rating 2001, Japan

G-SEED rating, Korea

Design & Construction Guidelines on the Rationalization of Energy Use for Houses 1992, Japan
 NatHERS 1993, Australia
 High Efficiency Equipment Certification Program 1996, Korea

Energy Efficiency Rating 1996, Australia

Energy Efficiency Standard & Labelling Program 1992, Korea

Building Law 1997, China

Design & Construction Guidelines on the Rationalization of Energy Use for Houses 1999, Japan

Energy Conservation Law, Japan

Rational Energy Utilization Act, Korea

Building Control Regulations, Singapore
 Environmental sustainability measures for new buildings

\$197 million for energy efficiency, Australia

31% total existing building floor area green certified, Singapore (till 2015)
 70% residential projects NatHERS rated, Australia (till 2015)
 1456 green star certified projects, Australia (till date)

4.86 billion sqm energy efficiency compliant, China
 100million tons of coal equivalent energy savings, China
 Reduction of energy intensity by 20% GDP, China

Building Retrofit Energy Efficiency Financing Scheme, Singapore

6 star NCC rating, Australia

Building Energy Efficiency Disclosure Act, Australia

Design Code for HVAC of civil buildings, China

Community Energy Efficiency Programme, Australia

Energy efficiency Information Grants Programme, Australia

Local Government Energy Efficiency Programme, Australia

Clean Building Managed Investment Trust Act, Australia

Building Control Regulations, Singapore
 Environmental sustainability measures for existing buildings

Finance Corporation, 2014, Japan

1979

2002

2003

2004

2005

2006

2007

2008

2009

2010

2011

2012

2013

Draft Analysis of Best Practices as per Stages of Housing Development

As per the discussion with IFC, the best practices were analysed across the development stages of housing projects. It was felt that such a frame of analysis may be most effective in arriving at potential policy touch points in the form of provisions most comprehensible to the SHLC partners and other stakeholders. Additionally, the analysis included the form of the provisions and their potential beneficiaries.

Indicatively, the following stages were identified for the analysis:

1. Land title and clearance
2. Project finance
3. Building planning and approvals
4. Implementation
5. Occupation
6. Monitoring

The following sections detail the analysis that was carried out and key questions/discussion points that were generated.

Land Title and Clearance

There are few, if any, provisions in policy and regulatory frameworks for sustainable housing. However, several states in India offer regulatory encouragement to affordable housing at this stage. This is as per the policy direction given by the National Urban Housing and Habitat Policy 2007 as well as the recently launched Pradhan Mantri Awas Yojana

(PMAY) programme. In light of this precedent, it is worth considering the provisions and their instances in India as shown in Table 2.1.

At the same time, while affordable housing project clearances are typically obtained through empowered state level approval and sanctioning committees, there is no similar institutional provision for sustainable housing. Further, such a committee/agency assesses the proposed project and categorises it as ‘affordable housing’, while in the field of sustainable housing, the developer would be able to claim its commitment on the basis of a pre-certification by a third party or by self-assessment. This gives rise to the following thematic imperatives to be addressed in a potential policy intervention:

- Formulating and implementing an institutional structure design for playing a ‘nodal’ role in sustainable housing development
- Mechanisms for pre-certification and audit/monitoring

Project Finance

While project capital finance is not directly related to the scope of work as delineated for IIHS, it has been found to be a key leverage mechanism to encourage sustainable housing in several countries in the EU, East Asia and Oceania. Table 2.2 summarises some of the key portfolio elements for grants and loans in these countries, with few instances or similar precedents in India.

S. No.	Provision	Beneficiary	Form of provision	Instances
1	Non Agricultural Land Status (deemed/time-bound/fast-track)	Developer	Saving in time and money for land use conversion process	Karnataka Affordable Housing Policy 2016; Maharashtra Solar Energy Policy
2	Rationalisation of Stamp Duty for registration	Developer	Reduction as per affordable housing category or flat reduction for all types of affordable housing	Maharashtra New Housing Policy 2015 (final draft); Karnataka Affordable Housing Policy 2016

Table 2.1: Land Title and Clearance

The following key questions present themselves in the analysis of a financial market creation and encouragement:

- What are the possible synergies between policy provisions and a financial market creation for sustainable housing?
- What may be the protocols for optimum utilisation of grants currently available through the Central and State governments?

S. No.	Provision	Beneficiary	Form of provision	Instances
1	Investment and Loans	Developer	Expansion of finance portfolio to include general and specific products for sustainable buildings and SMEs	UK – The UK Green Investment Bank, The Carbon Trust; Germany – Siemens Energy Efficiency Financing Scheme; EU/Belgium – “Green Obligation” bonds by ING bank; Korea; MHADA corpus of INR 1,000 crore for affordable housing (draft policy)
2	Investment and Loans	Developer and buyers	Low interest loans (linked to level of energy savings)	Italy and Japan (Japan Housing Finance Agency)
3	Grants	Developer	Energy Efficiency Grants Programmes for new housing	Australia – financial assistance of ~197 million AUD allocated since 2011 including 55 million AUD for low income Housing
		Developer	Grants for retrofitting existing buildings	Stockholm – National Grant to retrofit energy inefficient buildings; London -- The London Green Fund & London Energy Efficiency Fund (USD 50 million)
		Urban Local Body (ULB)	Central Financial Assistance (CFA) of up to INR 50 lakh per city (80 cities)	India: Solar Cities Programme (Ministry of New & Renewable Energy)

Table 2.2: Project finance

Building Planning and Approval

Development Plan and Building Plan approvals burden developers in terms of opportunity cost and more often, direct investment. Several countries, states/provinces and cities across the world have committed to reducing building and other approval process turn around time in order to enable faster delivery of development and housing. However, this is not a trivial or simple process because building codes require approvals or ‘No Objection Certificates (NOC)’ from a variety of agencies that are stakeholders in the urban development process. Table 2.3 summarises some of the best practices in various geographies in the field of expediting and lowering the actual and opportunity costs of administrative approvals, while ensuring delivery of development that is sustainable from an environmental perspective.

Incentives are balanced (or need to be so as to be sustainable) within the resources of all stakeholders involved. Therefore, while incentives in the planning and approval stages of project development may go a long way in supporting the overall development of preferred categories of projects, certain checks and

balances need to be incorporated in the mechanism of the provisions. Some of these may take the form of:

- Tracking compliance over longer periods of time – mechanisms and capacity gaps
- Infrastructure loading of additional built up areas on local networks – cost and recovery for sustainability
- Stretch on revenues and resources of local bodies and agencies
- Additionally, there may be potential for reducing resource loading on local areas through smart planning of cities and townships, that is, by creating enabling conditions for mixed land use in projects and encouraging less-commute or commute-less developments.

Implementation

Successful implementation of housing developments depends on a variety of factors such as material, labour supply and availability of temporary energy and water resources, amongst others. In order to scale the delivery of sustainable housing some countries

S. No.	Provision	Beneficiary	Form of provision	Instance
1	Energy Performance Building Directive / Energy Conservation Building Code / rating systems	NA/Mandatory for achieving emissions commitments	Energy codes integrated into building code; Penalties for non-compliance	Integration of code into the national building codes – Belgium, Finland, France, Italy, Norway, Sweden, Denmark, Germany, Spain, United Kingdom; Japan (penalties such as fines and “naming and shaming”); Singapore; Australia; Shanghai, China (based on climate zones); Punjab (The Punjab Municipal Green Buildings Incentives Policy 2016); Jaipur (Jaipur Development Authority since Sept 2014); ECBC notified in Rajasthan, Odisha, Uttarakhand, UT of Puducherry, Andhra Pradesh & Karnataka and amended in Uttar Pradesh, Kerala, Chhattisgarh, Gujarat, Tamil Nadu, Maharashtra, West Bengal, Bihar, Himachal Pradesh, Haryana, Madhya Pradesh and Delhi
2	Additional Floor Area Ratio	Developer	Additional/relaxation in Floor Area Ratio	Korea (based on G-SEED, BERS and EPI); Singapore (based on Green Mark Rating); Hong Kong, China; Punjab; Jaipur; Greater Noida, Haryana (Haryana Building Code 2016); West Bengal; Maharashtra & Karnataka (for affordable housing); Delhi
3	Development / building plan approval	Developer	Pre-certified green building projects: Priority for consideration, out of turn, by the Expert Appraisal Committee / State level Appraisal Committee	India – MoEF&CC, GoI; Karnataka Affordable Housing Policy 2016 (for affordable housing through state level empowered committee)
4	Building approval fee/ registration fee	Developer	Rebate on or waiver of approval fee	Korea (Abatement in Environment Improvement Tax based on G-SEED rating for 5 years); Seoul, South Korea (Certification Fee Aid based on G-SEED rating; Karnataka Affordable Housing Policy 2016 (for affordable housing, to the extent of affordable housing); Pune Municipal Corporation (IGBC rated buildings); Pimpri-Chinchwad Municipal Corporation (for adopting GRIHA);

Table 2.3: Building Planning and Approval

S. No.	Provision	Beneficiary	Form of provision	Instances
1	Tax benefits on materials, equipment and technologies	Developer	Modifications in national and local tax structures	France; China; Japan
2	Grant/subsidy on materials	Developer and buyer	Direct grants and indirect subsidies	Japan (electric/gas heat pumps, ultra high insulation windows and gas co-generation systems); Oslo (for energy efficient equipment and conversion to energy efficient heating)
3	Training Programmes	Developer	Training Programmes and Capacity Building for Carpenters and private builders	Japan; Singapore; Brussels

Table 2.4: Implementation

have committed to easing cost of acquisition of sustainable materials, while others have attempted to ensure availability of skilled labour for the same. Table 2.4 summarises some such initiatives.

In understanding these provisions, an aspect that emerges is that governments across the world are creating enabling conditions for the development of sustainable housing at larger scales. These conditions can lower the threshold of adoption for critical technologies, materials and equipment that can help developments become sustainable. The key thematic lines of inquiry that emerge are:

- Mechanisms to offset the direct cost of sustainable materials, equipment and technologies such as subsidies and tax regimes
- Development of an attendant skilled labour force

Occupancy

The norm in housing development is that developers tend to be responsible for managing and maintaining the project for a limited duration of time – and this may range from a few months to a few years after delivery. After this, the operation and maintenance of the project is typically handed over to an association of the owners and occupiers. This practice is significantly different from, for example, commercial or institutional developments where developers either continue managing the project indefinitely, or hand it over to a single entity. In light of the fact that operation and maintenance of facilities is critical to ensure their longevity and therefore their sustainability, several regions of the world have resolved to ensure that benefits continue to accrue to home owners and occupiers. Some of these are illustrated in Table 2.5.

S. No.	Provision	Beneficiary	Form of provision	Instances
1	Operational energy rates	Buyer	Subsidies to low energy & fine to high energy buildings by grid operator	Belgium
2	Penalties	Developer/buyer/ landlord/ estate agent	Penalties for non-compliance	United Kingdom (amount linked to type of building); Norway (buyer has right to seek compliance expert at developer's cost); Italy; Denmark; Belgium (criminal liability for developer)
3	Rewards & Awards	Developer/buyer/architect, etc.	Cash rewards and awards	China; India (Energy efficient solar/green buildings scheme, Ministry of New & Renewable Energy, GoI)
4	Local tax/levies concessions	Buyer	Reduction in local taxes and levies	Korea (property tax and property registration tax); Punjab (rebate in property tax for ECBC compliant buildings); Pimpri-Chinchwad (rebate in property tax for adopting GRIHA); Hyderabad (rebate in property tax for solar heating and lighting systems, and additionally to undertake wastewater recycling and rainwater harvesting)

Table 2.5: Occupancy

Several countries also favour a system of penalties to ensure continued compliance. However the typical arrangement is to allow for rebates in local taxes and levies for owners/buyers of sustainable housing. This gives rise to the following key questions on intent and outcomes of such provisions:

- How do governments (local, state or national) maintain a continuous engagement with housing developments after the developer has moved on?
- Rebates on local taxes and levies such as property tax, water and energy charges, etc., can lead to a dip in revenue for the agencies administering these services. What are the potential methods to address the same so as to ensure effective and sustained engagement from these agencies and local governments?

Monitoring

In any system of exchange of commitments from various stakeholders, the monitoring mechanism plays a critical role in maintaining compliance and sustained outcomes that benefit all. Monitoring may include self reporting in addition to auditing by external/ third parties. Table 2.6 illustrates some mechanisms to ensure compliance to a commitment framework between developers and the government.

At the same time, self reporting and audit systems need to be robust and responsive to dynamics in the housing market and policy ecosystem. The following key questions emerge from these provisions:

- Types of labelling systems and their protocols
- Audit capacity at the local level for effective monitoring and reporting

S. No.	Provision	Beneficiary	Form of provision	Instances
1	Labelling	All stake-holders	Display of EPC labels are mandatory and regime should penalise non-compliance	European Union
		All stake-holders	“Eco Dynamic Company” Label	Brussels
2	Energy performance / green rating Audit	State	Publication of energy audit/ performance data	Singapore (annual submission of building information & energy consumption data & 3 yearly energy efficiency audit of buildings)
		State	Projects cyclically reviewed by energy audit agency (Energy Services Company – over 90 registered in India) and penalised for non-compliance to ECBC	Punjab – 3 years (penalty = 5 times if found non-compliant) Jaipur and Uttar Pradesh (penalty = 200%); West Bengal (penalty = 150%)

Table 2.6: Monitoring

Potential Policy Touch Points to Encourage Sustainable Housing

An analysis of the previous section was presented to the SHLC partners on 29 March 2017 at the IFC office in Mumbai. Based on the discussions in the meeting, preliminary potential policy touch points were identified that could balance the interests of the developers, the government and its agencies and buyers of housing stock, while maintaining sustainability as the key concern of housing development.

Annualised Direct Support from State & Central Governments to Local Governments & Agencies

The MNRE has committed to granting INR 50 lakh to 80 cities under the Solar Cities programme. While this grant is committed to certain uses such as capital expenditure for installation of solar power facilities in the city, it is possible that such a fund or a similar fund be instituted for local bodies such as ULBs to enhance their capacity in approving pre-certification mechanisms and their subsequent monitoring. ULBs may choose to develop their internal capacity or set up teams or cells within their administration to deliver such services. Conversely, such funds may also be used to acquire the required expertise in the form of external consultants and Energy Service Companies (ESCOs) as well as to develop expertise in the monitoring of energy and other resources use in the residential sector. The potential for such grants for capacity building will need to be explored with the central and various state governments.

Convergence across Narratives Of Power, Climate & Housing at Local, Regional & National Levels

At the local level in particular, the government and agencies tasked with service delivery tend to operate exclusively in their sectoral domains. In order to

encourage sustainable housing, it is critical that energy, water, sanitation, waste and wastewater delivery systems be integrated with planning, design and material questions, in the context of diverse institutional jurisdictions over various services and statutory approvals. This requires a convergence of efforts at the local level in order to enable a single window and fast track approvals at various stages of project formulation and implementation. Such an institutional structure will need to be designed, and its functional protocols be clarified in order to minimise gaps and overlaps.

Forms of Indirect Incentives

Several countries, states/provinces and cities offer indirect incentives to developers to build green projects. These include additional FAR, TDR, relaxation in height restriction and open areas, etc. Developers can make immediate gains by utilizing these provisions for further gains in order to offset the incremental cost of building green projects. Such provisions are usually well within the jurisdiction of the local or state administrations. Buyers and end users would also likely benefit by buying/occupying a value added product at the same cost of a conventional development. At the same time it has to be kept in mind that such provisions must be formulated in the local context – additional floor area may be relevant only to a certain class of town size, and developing it may lead to increased pressure on natural resources and infrastructure networks. Therefore, in order to develop robust models for the same, it is critical to build analytical evidence with quantitative and qualitative frameworks within which the operation and sustenance of such provisions can be assessed.

Rebates to Lower Development Costs

Several instances of rebates in taxes, levies and fees were recorded in the research on policy encouragement

for sustainable housing. While single window and fast track approvals can alleviate some of the opportunity costs of housing developments, a critical analysis of local, regional and national fee and tax structures may lead to effective and efficient insights into possible modifications therein. However, while these may result in direct benefits to the developer, the fact is that some of these fees and levies are significant sources of revenue for ULBs and local agencies. Therefore, quantitative evidence will need to be built in order to justify certain forms of rebates, along with attendant propositions around the offsets to be created for the local bodies. Some of the fees and levies where intervention may be possible are:

- City government (ULB) and city agencies: Property tax, utility connection charges and external development charges, city level NOCs, etc.
- State government: Stamp duty fee, registration fee, various state level NOCs, state taxes on sustainable materials, equipment and technologies, etc.
- Central government: Tax on sustainable materials, equipment and technologies, etc.

Potential for Translating Incentive Structures for Affordable Housing

Investment in the affordable housing segment is set to receive a fillip with the slew of measures launched by the Central government through its Pradhan Mantri Awas Yojana programme and the various state level affordable housing policies for urban areas. It is possible to map the objectives of certain provisions of these initiatives to sustainable housing, as per the discussions with IFC and SHLC partners. On the one hand, the focus on affordable housing allows for an opportunity to develop these projects through a sustainable framework. On the other, the provisions for affordable housing in terms of direct and indirect financial and non-financial incentives gives us a precedent to work with. To the extent possible, the policy pillar of the SHLC will look at the possibilities of translating provisions made for affordable housing to sustainable housing in order to enable greater synergies in the housing development sector across urban areas of the country.

Labelling Systems

EU and several other countries and cities leverage the use of a labelling system to benchmark as well as to enhance the visibility of sustainable housing. Similar systems are gaining ground in India as well. While a majority of the instances of labelling are at the project level, Brussels, Belgium implements it at a company level offering interesting opportunities to develop the brand and visibility of developers that choose to use it. In any case, there is potential to use the label for direct gains by linking them with preferential approvals and where possible, to gain access to green funds and variegated interest rates.

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Annexes

1. **Presentation dated 7th March on Compendium on International and National Best Practices & Cases**

Policy Analysis and Recommendations for Sustainable Housing

International and National Best
Practices & Cases

Sustainable Housing Leadership Consortium
(SHLC), International Finance Corporation (IFC)

Objective and Methodology

Objective:

- To develop a compendium of International and National Best Practices / cases of policy support for promoting Sustainable Housing
- To develop the foundation and database for a comparative framework for assessment of Regulatory and other initiatives and interventions for promotion of Sustainable Housing

Methodology:

- Secondary data collection

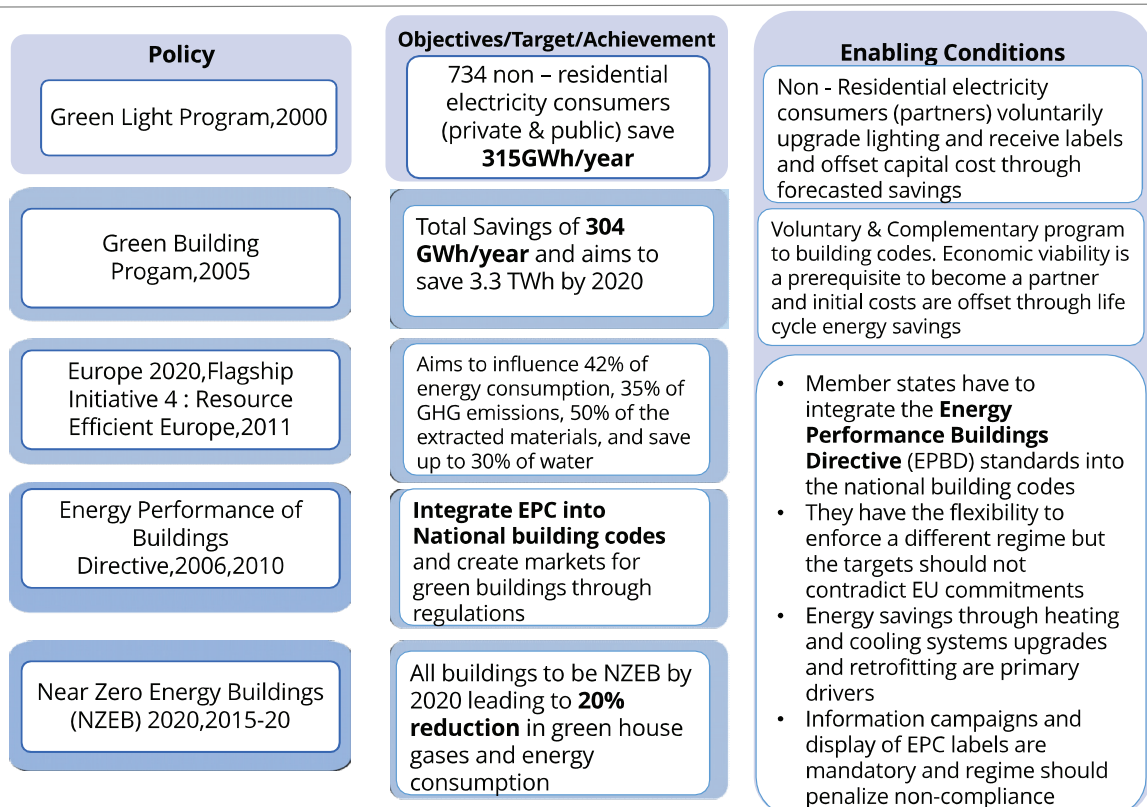
Focus Geographies:

- European Union
- East Asia & Oceania
- India

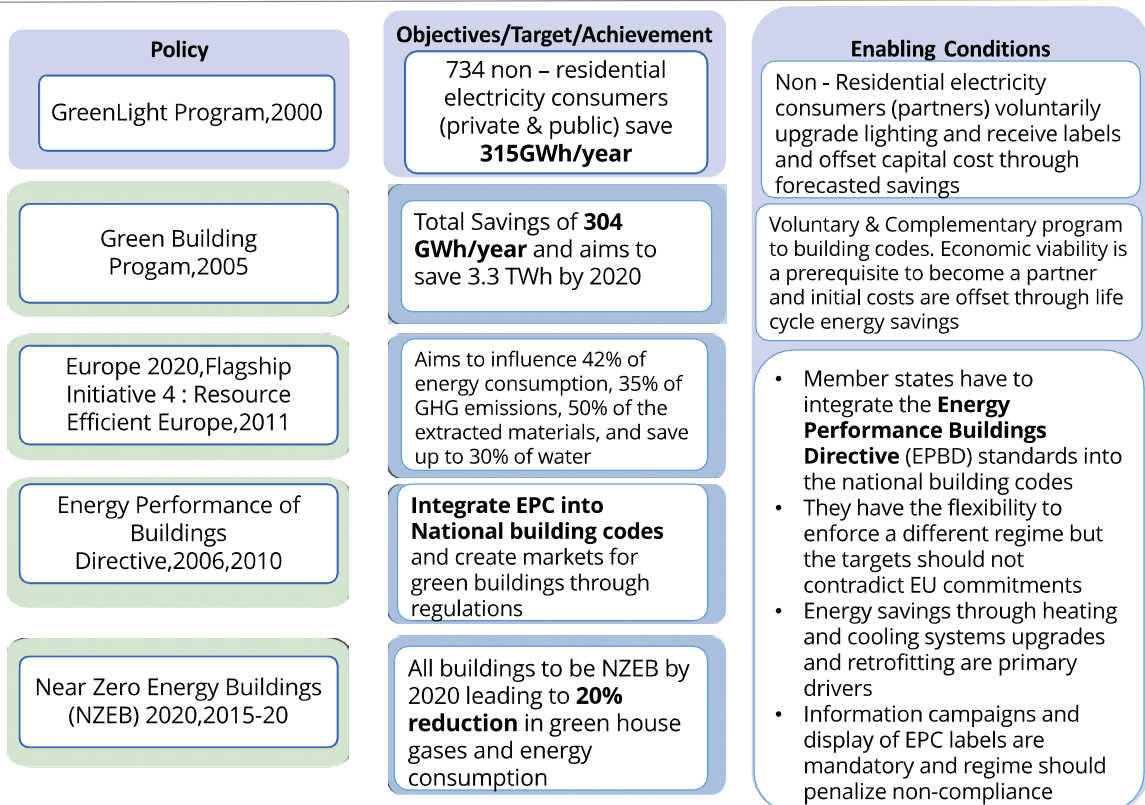
European Union

- [European Union – Meta Policy Framework](#)
- National Level – Regulations and Rating System Requirements & Energy Savings :
 - ❖ [Belgium, Finland and France](#)
 - ❖ [Italy, Norway, Sweden and Denmark](#)
 - ❖ [Germany, Spain and United Kingdom \(England\)](#)
- City Level Regulations and Incentives:
 - ❖ [Brussels and Oslo](#)
 - ❖ [Paris and London](#)
 - ❖ [Stockholm and Copenhagen](#)
- [Financing of Energy Efficient Housing](#)

European Union – Meta Framework



European Union – Meta Framework



National Level – Regulations

Country	Government Intervention	Ratings System and Measurement	Green Stock (2014)	Energy Savings 2010-2015
Belgium	Federal : Higher deduction from profits for investments in energy efficiency; tax reduction on acquisition of energy	EPC mandated by EPBD 45 KWh/m2 for new buildings	25% of residential stock	Heating : 6% reduction in CO2 Cooling : 5-10% reduction in consumption
	Regional: Subsidies and tax (VAT) reduction for retrofitting and installation	Subsidies to low energy& fine to high energy buildings by grid operator		
	Penalties : Criminal penalties for violation			
Finland	National Building Code with energy requirements.	EPC mandated by EPBD &BPI's developed by FGBC	1.2% of building stock	Heating :330 – 650 GWh/year Cooling :6.5 - 17.8 GWh/year
	The trend is towards coding energy standards into national laws and building codes. Involvement of building sector throughout the policy cycle aims to make implementation easier. Eg : FinZeb, a body currently deliberating on NZEB requirements.	130 KWh/m2/year for new buildings		
		Classifies buildings on a Energy scale ranging from A-G		
France	Energy Transition (CITE)- a tax benefit for the purchase of efficient materials & equipment.	EPC mandated by EPBD, DPE certificates, HQE systems & Regulation Thermique 2012	20% of building stock	Data NA
	National Plan for Housing Thermal Renovation-A fund for guarantee of loans with higher risk that will reimburse banks in case of non-payment and Financial support to owners whose renovations are made by qualified workers			

National Level – Regulations

Country	Government Intervention	Ratings System and Measurement	Green Stock (2014)	Energy Savings (2010-2015)
Italy	Regions & autonomous provisions can legislate and enforce building codes as long as they don't contradict EU laws.	EPC mandated by EPBD	20% of Residential Stock	Carbon Savings : 1,900,000 ton/year
	National Agency (ENEA) monitors implementation and strategizes to augment energy savings.	Minimum energy based on climatic condition		
	Penalties : Financial liability for not implementing energy saving directives.	NZEB ratings under development		Energy Savings : 9000GWh/year
Norway	Parliament legislated on Passive Energy Building requirements and Near Zero Energy Buildings.	Not a signatory of EPBD	20% of Residential Stock	1 million m2 of passive houses and 400,000 m2 of low energy buildings built through the national programme.
	Certification is an inter ministerial monopoly with no involvement of businesses at any stage. Enova, a public enterprise is currently the certifying entity.	Minimum energy : 95 kWh/m2/year for new buildings		
	Penalties : EPC is the owner's responsibility and it is difficult to penalize owners in residential sectors. Hence the buyer/tenant has been given the right to seek an expert EPC at the seller/owner's cost.	Independent assessment to certify buildings after construction		
Sweden	National Board of Housing, Building and Planning & Swedish Energy Agency strategize and implements EPCs and Parliament enacts the codes including NZEBs	EPC mandated by EPBD and building codes	23% of Building stock	Heating savings: 45GWh/year
	Complete renovation and retrofitting of houses under million houses programme.	Maximum estate energy is mandated based on type of housing and climate		Cooling savings : 32GWh/year
	The Swedish Estate Agents Inspectorate ensures compliance by owners to enforce EPC standards			

National Level – Regulations

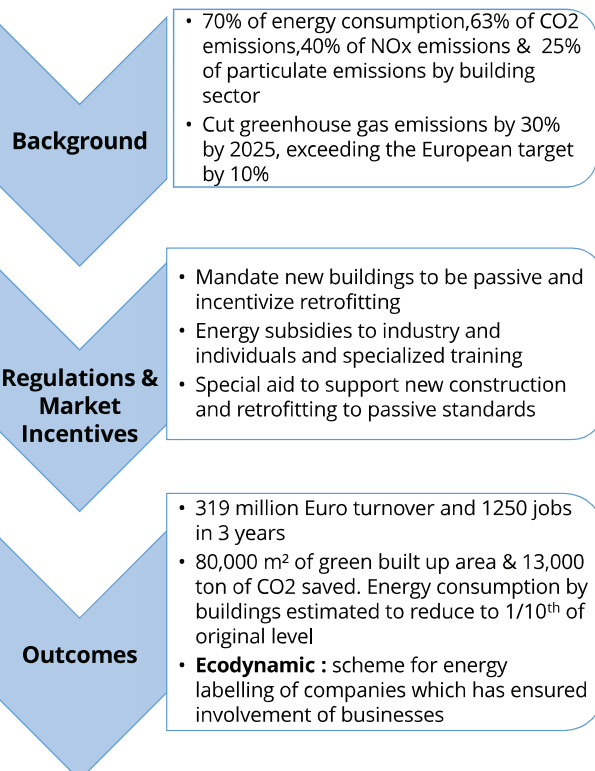
Country	Government Intervention	Ratings System and Measurement	Green Stock (2014)	Energy Savings (2010-2015)
Denmark	Danish Parliament & Federal Government enacted the National Energy Framework – a collaborative framework that strategizes energy efficiency.	EPC mandated by EPBD	29% of single family houses	Impact study yet to be conducted
	Completely voluntary agreements that gives developers and owners enough flexibility to achieve energy requirement targets	Minimum energy : 30 + 1,000 / A [kWh/m2/year] Minimum energy for NZEB buildings : 20 kWh/m2/year		
	Penalties : Penalties for non-adherence. Amount linked to floor area			
Germany	Rent linked to energy performance.	EPC mandated by EPBD, BNB & DGNB	10% of building stock	Heating : 3860 GWh (2014-16)
	Renewable Energy Surcharge : driver towards achieving overall less energy consumption and increase in generation from renewable sources	Primary energy cannot exceed 75% of referenced building		Cooling : NA
	Fine : Amount to be paid to the affected competitor	Warning notice for erring developers initiated by competitors		

National Level – Regulations

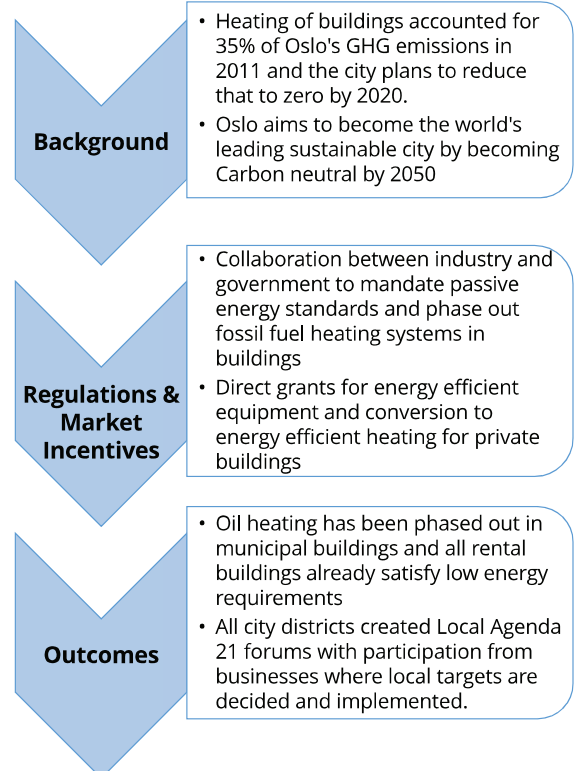
Country	Government Intervention	Ratings System and Measurement	Green Stock (2014)	Energy Savings (2010-2015)
Spain	Ministry of Industry, Energy and Tourism, the Ministry of Public Works and Transport, and regional administrations concurrently implement certifications	LIDER/CALENER enabled rating system that prescribes minimum energy requirements and component wise specifications	5.9% of building stock	Not available
	A national strategy to project various outcomes in different situations and the appropriate tools to be used is developed by Ministry of Finance & Public Administration.			
United Kingdom	Department for Communities and Local Government (DCLG) implements EPBD directive. Department of Energy and Climate Change implements EED directive	Energy requirements linked to CO2 emissions. Adapted into the EPBD framework. BREEAM rating system. Fine : Makes usage of buildings with low energy building in a time bound manner	Data to be confirmed	Zero carbon initiative & green deal are scrapped. The current regulations are expected to produce 6% CO2 savings over 2006 level
	Energy Company Obligation : energy companies legally mandated to provide funding for energy efficiency to low income households			
	Fines : Penalties for non-compliance. Amount linked to type of building			

City Level Regulations

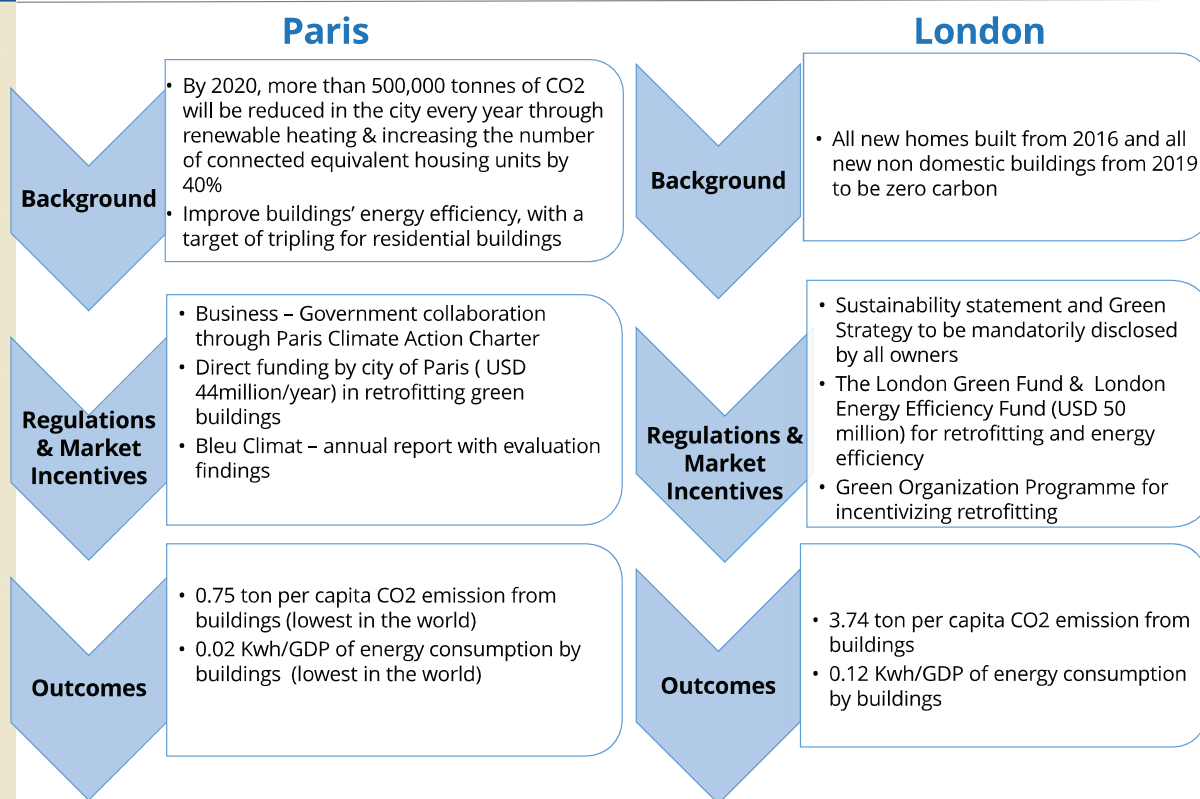
Brussels



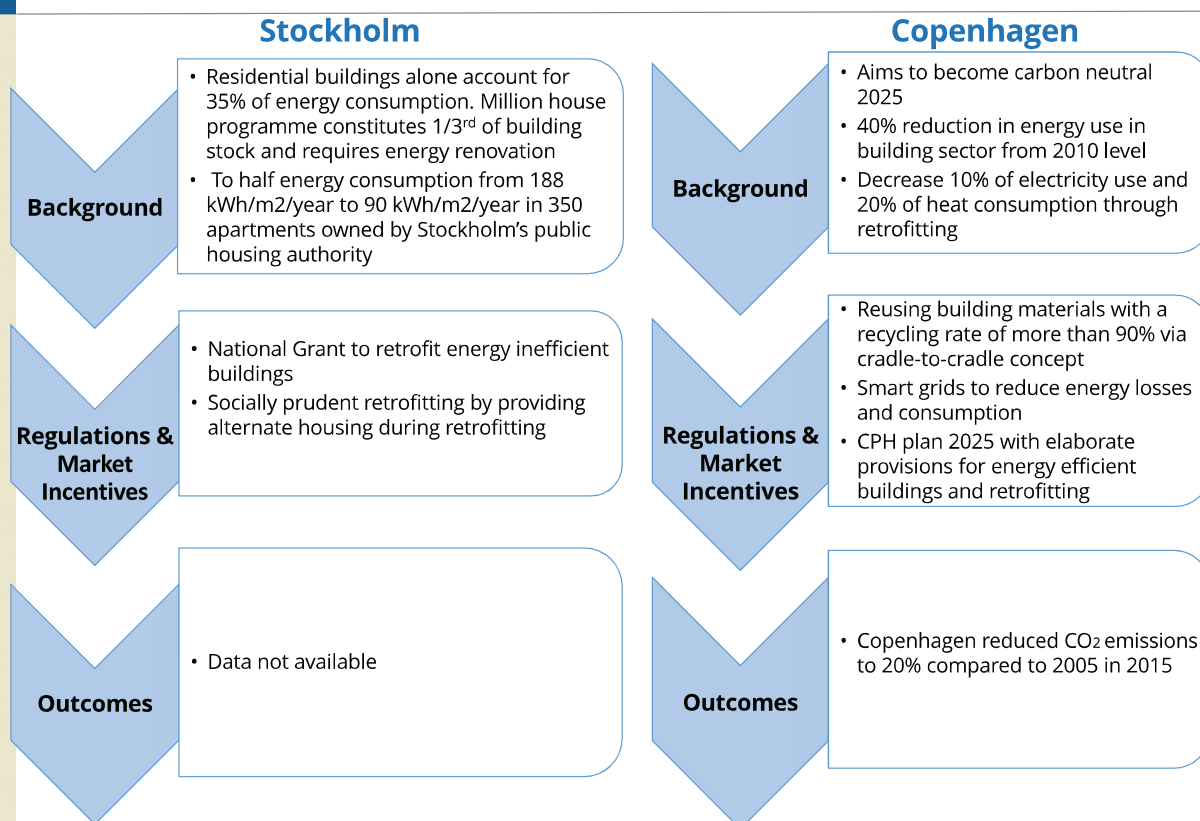
Oslo



City Level Regulations



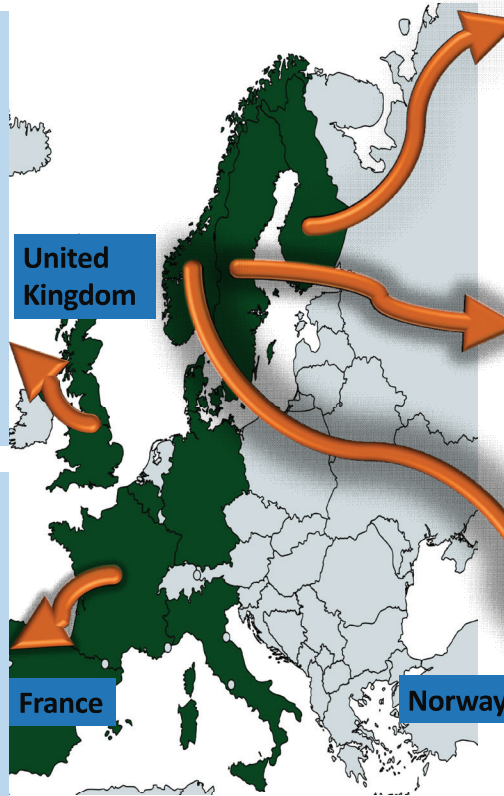
City Level Regulations



National Level – Financing

- **The UK Green Investment Bank**, government owned public limited company invests in green infrastructure on a commercial basis in collaboration with private sector
- **The Carbon Trust and Siemens Energy Efficiency Financing Scheme** offer small loans in flexible terms to SME's hitherto not supported by mainstream lending
- **RE:FIT program**, a partnership between the Greater London Authority and the Clinton Climate Initiative, support energy-efficiency retrofit in public-sector buildings on a commercial basis

- **Banque Publique d'Investissement**, a French public investment bank, finances renovation projects
- Public aids and tax credits like **Crédit d'Impôt en faveur du Développement Durable** have been created to promote renovation. VAT rate was reduced to 5.50 percent for energy-reduction work and repairs
- The French National Agency for Habitat (**Anah**) and private funding initiatives also incentivize retrofitting



Finland : Data not available

United Kingdom

Sweden

- The Swedish Energy Authority, together with different representatives for landlords, tenants and authorities, has funded a project led by the industry association, the Real Estate Owners (Sw. *Fastighetsägarna*) to develop green lease agreements
- Private initiatives focus on information and development of sustainable real estate projects

France

Norway

National programme for passive and low energy buildings directly supports building of energy efficient houses. The success of the programme led to it being replaced with another programme with more ambitious targets.

National Level – Financing

Denmark : Data not available

Belgium

- **Febelfin and Agoria** developed a special tool for banks to evaluate green loans by referencing future profits. All banks now offer green loans
- Specific financial products orientated on the surge of sustainable building investments in EU countries e.g., the five-year “**green obligation**” offered by ING and **impact bonds for social change** (Bank Degroof) are innovative instruments

- **No private green financing** initiatives for sustainable real estate projects. Banks finance only exclusive renewable energy projects
- While there are no incentives for efficient long term investments, **National Energy Efficiency Fund** and the **IDEA** has funding instruments. Eg : Aid Program for Energy Rehabilitation of Existing Buildings (**PAREER-CRECE**)

Spain

Germany

- **KfW Förderbank's** low-interest loans to developers and individuals for construction and rehabilitation
- **Siemens Financial Services** supports investments in the sector through its environmental portfolio
- Federal and 16 regional government's direct support
- Crowdfunding platforms (**Eco Crowd**) backed by German Environmental Foundation

Italy

- Italian National Action Plan for Renewable Energy provides tenders to award capital account contributions promoting renewable sources
- Small and Medium Enterprises (SMEs) commit to energy efficiency projects supported by a fund provided by **European Investment Agency**
- Banks offer businesses and households energy-efficiency loan financing

East Asia and Oceania

National Level Policies

- Japan
- China
- Korea
- Singapore
- Australia

City Level Measures

- Tokyo, Japan
- Shanghai, China
- Hong Kong, China
- Seoul, South Korea
- Sydney, Australia

Japan

Policy Driver	Targets	Policy Instruments	Effect
INDC in Paris Climate Change Agreement	40 % reduction in emissions from residential sector	Zero Energy House (ZEH) concept promoted, Excellent Long-Term Housing Promotion Act to increase design life of houses from 24 years to 40 years	
Law Concerning the Rational Use of Energy, 1979 (Last revised 2013)	NA	Energy Standards for Housing: Criteria for Clients on the Rationalization of Energy Use for Houses, Design and Construction Guidelines on the Rationalization of Energy Use for Houses – mandatory compliance for buildings > 300 sqm	50 % compliance rate in Housing sector in 2011
		Information Programs in place: Comprehensive Assessment System for Building Environmental Efficiency (CASBEE)- mandatory in 24 local government areas	541 buildings certified including 119 detached houses
		Low interest Loans through Japan Housing Finance Agency- higher loan for higher standards met	
		Tax deductions for energy efficient equipment such as highly efficient air conditioning systems, high insulation windows facilities, and light-emitting diodes used in residential sector	
		New Energy and Industrial Technology Development Organization (NEDO) subsidy for energy efficient technologies including electric/gas heat pumps, ultra high insulation windows and gas cogeneration systems used in residential buildings (up to one third of the cost)	
		Financial Assistance for Energy Efficient renovation upto one third of the cost	

Japan (Continued)

Policy Driver	Targets	Policy Instruments	Effect
-do-	-do-	Penalties: in case of non compliance buildings >2000 sqm Naming-and-shaming and fines up to 1 million yen Builders of 150 houses/year fine up to 1 million yen	
		Training Programs for Carpenters and private builders for energy efficient building practices	More than 200,000 carpenters trained till 2011

China

Policy Driver	Targets	Policy Instruments	Effect
Energy Conservation Law of the People's Republic of China 1998 (Last revised 2008)	NA	Residential Buildings energy codes based on climatic zones: JGJ 26, 75, 134	6.9 Billion sqm built as per standards after 2006
		Information system: Evaluation Standard for Green Building aka Three Star Standard 2006	127 residential buildings certified till 2011
		Backing to ESCOs in form of grants at National and Local level: 240 RMB from National government and 60-260 RMB from local government each tce saving by ESCO	
		50 % Tax reduction on sale of energy saving construction material	350 Billion energy efficient bricks sold 2006-2010
		Rewards for performance: cash incentives to two (45 RMB/sqm) and three star rated buildings (80 RMB/sqm)	
		Retrofit Rewards: for energy efficient investments made on existing buildings (45-55 RMB/sqm)	182 Million sqm retrofitted space created in 2007, Energy saving 2 Mtce annually

Korea

Policy Driver	Targets	Policy Instruments	Effect
Rational Energy Utilization Act 1979 Energy Basic Law 2006	NA	Comprehensive Green Building Program by government, Building Design Code for Energy Saving (2010)	
		Information system: Green Standard for Energy and Environmental Design (G-SEED) Labelling and certification by KGBC, Building Energy Rating System (BERS), Energy Performance Index (EPI)	
		Relaxation in Floor Area Ratio, Height Restriction, Landscape Area Ratio by MOLIT based on G-SEED, BERS and EPI (1-12 %)	
		Additional Points in Pre-Qualification of Public Procurement based on G-SEED and BERS (0.5-1.0 points)	
		Reduction in Property Registration Tax based on G-SEED, BERS and EPI (5-15 %)	USD 700,000 over 472 Projects including residential from 2010
		Reduction in Property Tax for 5 Years based on BERS and G-SEED rating (5-15%)	
		Abatement in Environment Improvement Tax based on G-SEED rating for 5 years (20-50%)	
		Additional Price Incentive on calculation of Parcel price for Housing Price Ceiling system ~additional 3% of construction cost on Green certification from 2005 in apartment buildings. Parcel Price Ceiling System limits housing prices in South Korea.	Certifications jumped from 33 cases in 2005 to 163 in 2006 (thereafter 150-200 cases every year till 2013)
		Low interest rate loans to building providers from 2004	
		Institutions in place: Korea Energy Management Corp (KEMCO)	

Singapore

Policy Driver	Targets	Policy Instruments	Effect
Energy Conservation Act (Latest revision 2013)	>80 % buildings to be Green Mark certified by 2030	Residential Buildings energy codes	
		Information system: Green Mark	
		Building Control (Environmental Sustainability) Regulations 2008	All new buildings (>2000 sqm) to achieve minimum of Green Mark certified standard
		Green Mark Incentive Scheme for New Buildings (Gross Floor Area GFA >2000sqm) to developers for Gold or higher standard	SGD 20 million fund fully committed
		3 yearly energy efficiency audit of buildings	Total number of Green Buildings: >2,700
		Annual submission of building information & energy consumption data	Total Green GFA: >80 million sqm
		GFA concessions based on Green Mark rating	
		Energy efficiency program for household – Awareness, Energy efficiency mobile applications -"Home Energy Auditor (HEA)" and "Life Cycle Cost Calculator (LCCC)"	% of total GFA: > 31%
		Building Retrofit Energy Efficiency Financing scheme (BREEF), S\$50 million Green Mark Incentive Scheme for Existing Buildings and Premises	
Capacity Building Programs at BCA Academy	>13000 PMETs trained		

Australia

Policy Driver	Targets	Policy Instruments	Effect
Environment Protection and Biodiversity Conservation Act 1999 Building Energy Efficiency Disclosure (BEEED) Act 2010	NA	National Construction Code sets energy efficiency standards – minimum 6 star rating since 2010	
		Information system: Nationwide House Energy Rating Scheme (NatHERS), Green Star	818 Green Star certified projects 70 % new houses and apartments being rated through NatHERS
		Assistance to owners through Your Energy Savings and Your Home online portals	
		Energy Efficiency Grants Programmes for financial assistance~197 million USD allocated since 2011 including 55 million USD for low income Housing	
		Financial Institutions: Clean Energy Finance Corp (CEFC), Land & Housing Corporation	CEFC finance of 250 million USD for energy efficient Community Housing nationwide
		Minimum Energy Performance Standards (MEPS) for household appliances and equipment	

City Level Measures

City	Background	Measures	Effects
Tokyo, Japan	Residential sector emits 32.4% of total emissions. Target to reduce overall emissions by 25% by 2020 below 2000 levels	<ul style="list-style-type: none"> Green Building Program: Mandatory disclosure of Building Environment Plan for GFA>5000sqm. Voluntary for 2000-5000 sqm GFA buildings Green Labelling Program for Condominiums: Mandatory disclosure of environmental performance at sale or lease 	Green Labeling- At the time of the program's start, less than 30% of covered properties achieved the highest rating of three stars for the "Building insulation" and "Equipment energy efficiency" items. The proportion has now increased to around 90%
Shanghai, China	Note: Measure are over and above incentives from National Government	<ul style="list-style-type: none"> New buildings to achieve minimum one star under Three Star Label. For two or three star rated buildings: direct subsidy of 60 RMB/sqm (maximum: 6 million yuan for normal projects and 10 million yuan for low-income housing projects). The subsidy applies to: 1) two-star residential buildings of 25,000 m2 and above; 2) three-star residential buildings of 10,000 m2 and above For High Energy Efficiency Buildings (70% or more savings): 60 RMB/sqm, for residential buildings >50,000 sqm 	
Hong Kong, China	Own Information system: BEEM Plus by HKGBC	<ul style="list-style-type: none"> Sustainable Building Design (SBD) Guidelines BEEM Plus certification (rating not mandated) Additional GFA upto 10% upon compliance Buildings Energy Efficiency Funding Schemes (BEEFS) (now closed)-Subsidies for energy efficiency improvement 	Energy savings of 180 million kWh per annum, or about 120,000 tonnes reduction in carbon dioxide emission

City Level Measures (Continued)

City	Background	Measures	Effects
Seoul, South Korea	378,000 or 57% of total building stock is Residential	<ul style="list-style-type: none"> • Certification Fee Aid based on G-SEED rating (50-100%) • Introduction of outdoor illumination level standards by revision of the "Light Pollution Prevention Ordinance" • 100% LED lights mandatory for new buildings 	Power consumption in Apartments down to 190 kWh/sqm in 2014 from 200 kWh/sqm in 2012
Sydney, New South Wales (NSW), Australia	City aims to cut emissions by 70% by 2030 against 2006 levels as per Sustainable Sydney 2030 masterplan. Sydney is the first government in Australia to be certified as Carbon Neutral under the National Carbon Offset Standard.	<ul style="list-style-type: none"> • Mandatory BASIX (NSW) Certificate at planning stage for works >AUD 50000 • New public housing projects built by the NSW Land & Housing Corporation are required to achieve a six-star NatHERS rating <p>Note: Building Sustainability Index (BASIX) sets higher standards in NSW than NCC at federal level.</p>	
Singapore	As Mentioned in earlier section		

India

- Policy Drivers
- National level Missions, Policies & Programmes State Level Initiatives for Incentives
- Maharashtra Housing & Solar Energy Policies
- Karnataka Housing & Solar Energy Policy
- City Level Initiatives for Incentives

India (National Level)

Policy Driver

Paris Agreement
(4th November, 2016)
&
Sustainable
Development
Goals Framework

Targets

To cut GHG emissions
intensity by 33-35%
by 2030 (Relative to
2005 levels)

Enabling conditions

Technology transfer and
international finance including
Green Climate Fund (GCF)

Coal cess to generate \$ 4
billion annually for its National
Clean Energy Fund

National Mission for Enhanced
Energy Efficiency (Perform,
Achieve Trade platform)

Jawaharlal Nehru National Solar
Mission, National Wind
Mission, National Mission for
Sustainable Habitat

Energy Codes (ECBC, BEE) and
Rating Systems (GRIHA, LEED,
IGBC)

India (National Level)

Policy Instruments

National Mission on
Sustainable Habitat
(Ministry of Urban
Development, GoI)

Targets

- * Mandatory application of
ECBC (Could help reduce energy
consumption by about 1.7 billion
units of electricity per year)
- * To promote Building Rating
Systems

Enabling conditions

Soft construction loans: More
efficient buildings attracting
lower interest rates

Tax incentives / penalties

Adjust Power Tariffs

CDM* certification for energy
efficiency programmes

National Urban
Housing and Habitat
Policy, 2007 (Ministry
of Housing and Urban
Poverty Alleviation,
GoI)

- * Affordable Housing for All
- * Enhancing Energy and Cost
Efficiency
- * Promote PPP for Housing
Projects

Relaxation of FAR, TDR

Fiscal Concessions (Ministry of
Finance, NHB)

Encourage FDI for Housing
projects

Rationalization of Stamp Duty

India (National Level)

Policy Instruments

Solar Cities Programme
(Ministry of New & Renewable Energy, GoI)

Targets

- * Target of total 60 cities (Out of which 8 cities as "Model solar City" and 15 cities as "Pilot Solar City")
- * 100 small townships and campuses
- *Preparation of "Master Plan" (For Energy demand, year wise targets for energy conservation, GHG abatement, etc)
- * Setting up of "Solar City Cell" in city council for planning and implementation

Enabling conditions

Central Financial Assistance (CFA) of up to Rs.50 Lakhs per city

CFA up to Rs. 2.5 Crores for each pilot solar city

CFA up to Rs.5 Lakhs for townships / campuses

CFA up to Rs.9.5 Crores for each model solar city (on condition that matching fund up to Rs.9.5 Crores is provided by ULB)

India (National Level)

Policy Instruments

1. Off-Grid and Decentralized Solar Applications Scheme.
 2. Grid connected rooftop and small solar power plants programme
- (Ministry of New & Renewable Energy, GoI)

Targets

- To promote SPV* rooftop and SPV power generating plants among residential, institutional, industrial and commercial sectors.
- To create enabling environment for investment in solar energy sector by private sector, state government and individuals

Enabling conditions

Central Financial Assistance (CFA) of up to 30% / 70% of the benchmark cost or the actual project cost as applicable , whichever is lower

Up to 3% of CFA would be admissible as the service charge to the state nodal agencies*

India (National Level)

Policy Instruments

Energy Efficient Solar / Green Buildings Scheme.
(Ministry of New & Renewable Energy, GoI)

Targets

* Expenditure of Rs.10 Crores is estimated to be incurred under this activity during 2013-14 and rest of the 12th plan period

Enabling conditions

Incentives for capacity building and awareness activities (Rs.2 Lakhs for 1-2 days and Rs.3 Lakhs for 3 day activity)

Awards for ULB's (Award of Rs.10 Lakh for 3 best ULB's per year)

Awards to Green Buildings having maximum RE installations (Award of Rs.15 Lakh, Rs.10 Lakh and Rs.5Lakh for 3 buildings per year)

Awards to Architects / Design Consultants (Award of Rs.5 Lakh, Rs.3 Lakh and Rs.2 Lakh for 3 per year)

India (Incentives for GRIHA / LEED / IGBC Rated Buildings at State Level)

The Punjab Municipal Green Buildings Incentives Policy 2016

- ✓ Compliance of Punjab ECBC* is mandatory for buildings with connected load of more than 100kW or conditioned area of 500sqm or more.
- ✓ 15 % rebate in property tax for ECBC compliant buildings.
- ✓ Additional 5 % FAR on submission of Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum)
- ✓ Projects reviewed by rating agency every 3 years (penalty equivalent to 5 times if found non-compliant)

Haryana Building Code 2016 (Green Building measures and Incentives)

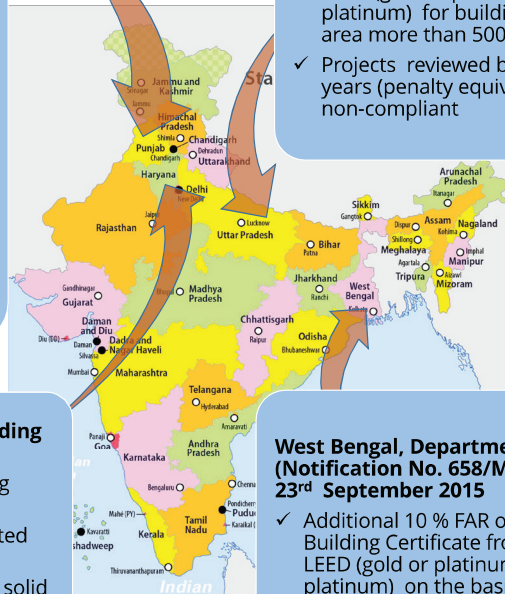
- ✓ 5 % to 20 % additional FAR* for installing Solar Photovoltaic Power Plant.
- ✓ 5% to 25% Additional FAR for Green Rated Buildings.
- ✓ 5 % Additional FAR for installing on site solid waste treatment plant

Uttar Pradesh Urban Development Authority (Notification No. 835/8-3-15-13/VVD/15 dt. 12th October 2015)

- ✓ Additional 5 % FAR on submission of Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum) for building constructed on land area more than 5000sqm.
- ✓ Projects reviewed by rating agency every 5 years (penalty equivalent to 200% if found non-compliant)

West Bengal, Department of Municipal Affairs (Notification No. 658/MA/O/C-4/3R-3/2014 dt. 23rd September 2015)

- ✓ Additional 10 % FAR on submission of Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum) on the basis of pre-certification
- ✓ Periodic inspection by rating agency (penalty equivalent to 150% if found non-compliant)



Maharashtra : New Housing Policy, 2015 (Final Draft)

Targets

* To provide
19 lakh
houses by
year 2020
(EWS, LIG &
MIG)

Enabling conditions

Land availability: Government land bank

Housing Fund : Provision for diverting 50% of PF fund in this. Can apply for house in Govt. scheme after 10 years of contribution to this fund. Can also utilize this amount to purchase house from private developer.

Interest only Housing Loans: MHADA* will create a fund with an initial corpus of Rs. 1000 crore to provide funding to developers who are building LIG / EWS houses.

Employee Housing: Employers responsibility to provide housing to their employees through concession in VAT / Stamp duty / professional tax at state level

Stamp Duty Concession: EWS-1% of market rate, LIG-2% of market rate, MIG-3% of market rate

Affordable Housing Scheme: Additional FAR* and Tax concessions

Inclusive housing in all housing projects : 20% of built-up area mandatory

Conservation of water, Environment and Heritage Structures: Compulsory LEED / other equivalent certification to avail FAR / other benefits

Strategy for Ease of Doing Business: TDR*, Use of IT, Use of land as collateral security, Built-up area in lieu of development charges, Reimbursement of taxes (5% of construction cost), Appointment of regulator

Maharashtra : Solar Energy Policy

Policy Instruments

Grid Connected
Solar Energy
Policy, 2016
(Udyog Urja and
Kamgar Vibhag,
Government of
Maharashtra)

Targets

* 7500MW
capacity
solar power
projects
(2500MW by
MAHAGENEC
O in PPP
mode and
5000MW by
other private
developers)

Enabling conditions

Electricity duty will not be levied for first 10 years

Can be installed in industrial areas, townships,
warehouse areas and other available locations

Deemed non-agricultural land status

Government wasteland can also be granted on
leasehold basis, as per availability, by the
respective district collector

Can be registered as industrial units

Maharashtra : Solar Energy Policy

Policy Instruments

Off-Grid Connected Solar Energy Policy, 2016

(Udyog Urja and Kamgar Vibhag, Government of Maharashtra)

Targets

* 200MW capacity solar power from rooftop and on ground

* 10000 solar water pumps

* Solar power for cooking and solar hot water system

Enabling conditions

5% of district budget will be secured for this purpose

100 % subsidy in government projects (Rs.340 crores / year budget for 5 years)

Incentive (direct grant) of Rs.20/W or 20% of solar power system cost (Rs.20 Crores / year budget for 5 years) in private projects

Incentive (direct grant) of Rs.1500/sqm of solar panel area for solar water cost (Rs.8 Crores / year budget for 5 years) in private projects

Karnataka : Affordable Housing Policy, 2016

Targets

* To provide **15 lakh** additional houses by year 2022 (50-60% will be EWS, LIG & MIG)

Enabling conditions

Inclusive housing in all private housing projects : 10% of residential portion of site shall be reserved for Affordable Housing Units (AHU's). TDR to private developers as per KTPC act.

Extra FAR: In township projects, developers will get extra FAR to the extent of built-up area reserved for AHU's . This FAR should be preferably consumed on the same site.

Diversion of Agricultural land for housing projects

Stamp duty fees: Reduced from 7% to 5%

Fast track approvals

Projects shall be exempted from payment of building plan sanction / Approval fee to the extent of AHU's

Incubators for promoting local materials & skills in Affordable Housing

Karnataka : Solar Renewable Energy Policy 2009-14

Policy Instruments

Karnataka Renewable Energy Policy, 2009-14
(Energy Department, Karnataka)

Targets

- * To achieve 20% share from renewable energy sources
- * 25000 solar roof top units of 5 to 10 kvp with net metering (250MW potential in 5 years)

Enabling conditions

Energy Conservation Fund: Green energy cess at Rs.0.05 / unit on commercial and industrial consumers to generate Rs.55 crores annually.

Industry status (Incentives for industrial units to be extended for this purpose)

CDM benefits: The Karnataka Renewable Energy Development Limited (KREDL) will facilitate building of various renewable energy projects to avail maximum CER benefits under UNFCCC / Kyoto protocol

Karnataka : Solar Energy Policy 2014-21

Policy Instruments

Karnataka Solar Energy Policy, 2014-21
(Energy Department, Karnataka)

Targets

- * To add solar power generation by 2000MW by 2021 (3% out of total projected energy consumption)

Enabling conditions

Solar projects under Renewable Energy Certificate (REC) Mechanism are eligible for policy benefits

GoK shall promote grid connected solar rooftop projects on public and private buildings through net metering and gross metering methods

GoK contemplates to amend building byelaws w.r.t. FAR in coordination with BBMP/local bodies to exempt FAR in respect of additional floor area under solar PV panels. (not yet operationalized)

Tax concessions in respect of entry tax, stamp duty and registration charges shall be as per Karnataka Industrial Policy

India (Incentives for GRIHA / LEED / IGBC Rated Buildings at City Level)

Jaipur Development Authority (Sept 2014)

- ✓ Compliance with ECBD* and get certificate from Rajasthan Renewable Energy Corporation Limited.
- ✓ Additional 5 % FAR on submission of Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum)
- ✓ Projects reviewed by rating agency every 3 years (penalty equivalent to 200% if found non-compliant)

Greater Noida Industrial Development Area Building Regulations 2016

- ✓ Additional 5 % FAR on submission of Green Building Certificate from GRIHA (4 or 5 star), LEED (gold or platinum) or IGBC (gold or platinum)
- ✓ Projects reviewed by rating agency every 5 years (penalty equivalent to 200% if found non-compliant)

Pune Municipal Corporation (2016)

- ✓ 5% to 15% premium on building permission fees for IGBC rated buildings

Pimpri-Chinchwad Municipal Corporation

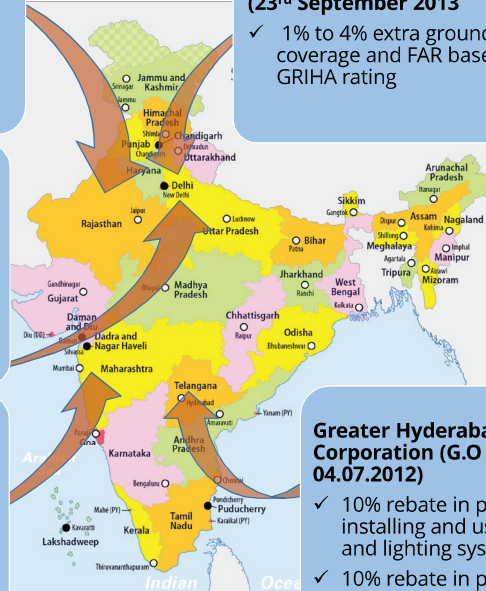
- ✓ 10% to 50% of premium to developers for adopting GRIHA
- ✓ 5% to 10% discount in property tax to occupants for adopting GRIHA

Ministry of Urban Development, Delhi Division (23rd September 2013)

- ✓ 1% to 4% extra ground coverage and FAR based on GRIHA rating

Greater Hyderabad Municipal Corporation (G.O MS.168 dt. 04.07.2012)

- ✓ 10% rebate in property tax for installing and using solar heating and lighting system
- ✓ 10% rebate in property tax to undertake both waste water recycling and rain water harvesting



2. Presentation dated 29th March on Draft Analysis and Policy Touch Points

Policy Analysis and Recommendations for Sustainable Housing

Policy Touch Points (Draft)

Sustainable Housing Leadership Consortium (SHLC)

International Finance Corporation (IFC)

Structure of the Presentation

1. Stage wise analysis of existing national and international policy instruments for sustainable housing
 1. Land Title and Clearance
 2. Project Finance
 3. Building Plan Approvals
 4. Implementation
 5. Occupation
 6. Monitoring
2. Preliminary potential policy touch points

Stage 1: Land Title & Clearance

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Non Agricultural Land Status (deemed/time-bound/fast-track)	Developer	Saving in time and money for land use conversion process	Karnataka Affordable Housing Policy 2016; Maharashtra Solar Energy Policy
2	Rationalization of Stamp Duty for registration	Developer	Reduction as per affordable housing category; Or flat reduction for all types of affordable housing	Maharashtra New Housing Policy 2015 (final draft); Karnataka Affordable Housing Policy 2016

Pre-certification only potential tool to enable such provisions for sustainable housing
Pre-certification comes with attendant difficulty in monitoring and audit

Stage 2: Project Financing (1/2)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Investment and Loans	Developer	Expansion of finance portfolio to include general and specific products for sustainable buildings and SMEs	UK – The UK Green Investment Bank, The Carbon Trust; Germany – Siemens Energy Efficiency Financing Scheme; EU/Belgium – “Green Obligation” bonds by ING bank; Korea; MHADA corpus of Rs. 1,000 crore for affordable housing (draft policy)
2	Investment and Loans	Developers and buyers	Low interest loans (linked to level of energy savings)	Italy and Japan (Japan Housing Finance Agency)

Policy linkages to Finance/financial instruments

Stage 2: Project Financing (2/2)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
3	Grant	Developer	Energy Efficiency Grants Programmes for new housing	Australia -- financial assistance of ~197 million USD allocated since 2011 including 55 million USD for low income Housing
	Grant	Developer	Grants for retrofitting existing buildings	Stockholm – National Grant to retrofit energy inefficient buildings; London -- The London Green Fund & London Energy Efficiency Fund (USD 50 million)
	Grant	ULB	Central Financial Assistance (CFA) of up to Rs. 50 lakh per city (80 cities)	India: Solar Cities Programme (Ministry of New & Renewable Energy)

Optimum utilization of available grants

Stage 3: Building Approvals (1/3)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Energy Performance Building Directive / Energy Conservation Building Code / rating systems	NA/Mandatory for achieving emissions commitments	Energy codes integrated into building code; Penalties for non-compliance	Integration of code into the national building codes – Belgium, Finland, France, Italy, Norway, Sweden, Denmark, Germany, Spain, United Kingdom; Japan (penalties such as fines and “naming and shaming”); Singapore; Australia; Shanghai, China (based on climate zones); Punjab (The Punjab Municipal Green Buildings Incentives Policy 2016); Jaipur – (Jaipur Development Authority since Sept 2014); ECBC notified in Rajasthan, Odisha, Uttarakhand, UT of Puducherry, Andhra Pradesh & Karnataka and amended in Uttar Pradesh, Kerala, Chhattisgarh, Gujarat, Tamil Nadu, Maharashtra, West Bengal, Bihar, Himachal Pradesh, Haryana, Madhya Pradesh and Delhi

Tracking ECBC compliance

Stage 3: Building Approvals (2/3)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
2	Additional Floor Area Ratio (FAR)	Developer	Additional/relaxation in Floor Area Ratio	Korea (based on G-SEED, BERS and EPI); Singapore (based on Green Mark Rating); Hong Kong, China; Punjab; Jaipur; Greater Noida, Haryana (Haryana Building Code 2016); West Bengal; Maharashtra & Karnataka (for affordable housing); Delhi

Infrastructure loading and offset

Stage 3: Building Approvals (3/3)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
3	Development/building plan approval	Developer	Pre-certified green building projects: Priority for consideration, out of turn, by the Expert Appraisal Committee / State level Appraisal Committee	India – MoEF&CC, GoI; Karnataka Affordable Housing Policy 2016 (for affordable housing through state level empowered committee)
4	Building approval fee/registration fee	Developer	Rebate on or waiver of approval fee	Korea (Abatement in Environment Improvement Tax based on G-SEED rating for 5 years); Seoul, South Korea (Certification Fee Aid based on G-SEED rating; Karnataka Affordable Housing Policy 2016 (for affordable housing, to the extent of affordable housing); Pune Municipal Corporation (IGBC rated buildings); Pimpri-Chinchwad Municipal Corporation (for adopting GRIHA);

ULB revenue

Stage 4: Implementation Stage

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Tax benefits on materials, equipment and technologies	Developer	Modifications in national and local tax structures	France; China; Japan
2	Grant/subsidy on materials	Developer and buyer	Direct grants and indirect subsidies	Japan (electric/gas heat pumps, ultra high insulation windows and gas co-generation systems); Oslo (for energy efficient equipment and conversion to energy efficient heating)
3	Training Programmes	Developer	Training Programmes and Capacity Building for Carpenters and private	Japan; Singapore; Brussels

Offsetting capital expenditure through tax regimes

Stage 5: Occupation (1/2)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Operational energy rates	Buyer	Subsidies to low energy & fine to high energy buildings by grid operator	Belgium
2	Penalties	Developer/buyer/ landlord/estate agent	Penalties for non-compliance	United Kingdom (amount linked to type of building); Norway (buyer has right to seek compliance expert at developer's cost); Italy; Denmark; Belgium (criminal liability for developer)
3	Rewards & Awards	Developer/buyer/architect, etc.	Cash rewards and awards	China; India (Energy efficient solar / green buildings scheme, Ministry of New & Renewable Energy, GoI)

Continuous encouragement

Stage 5: Occupation (2/2)

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
4	Local tax/levy concessions	Buyer	Reduction in local taxes and levies	Korea (property tax and property registration tax); Punjab (rebate in property tax for ECBC compliant buildings); Pimpri-Chinchwad (rebate in property tax for adopting GRIHA); Hyderabad (rebate in property tax for solar heating and lighting systems, and additionally to undertake waste water recycling and rain water harvesting)

ULB revenue

Stage 6: Monitoring

S. No.	Provision	Beneficiary	Form/outcome of benefit	Instances
1	Labelling	All stakeholders	Display of EPC labels are mandatory and regime should penalize non-compliance	European Union
		All stakeholders	"Eco Dynamic Company" Label	Brussels
2	Energy performance / green rating Audit	State	Publication of energy audit/performance data	Singapore (annual submission of building information & energy consumption data & 3 yearly energy efficiency audit of buildings)
		State	Projects cyclically reviewed by energy audit agency (Energy Services Company – over 90 registered in India) and penalized for non-compliance to ECBC	Punjab – 3 years (penalty = 5 times if found non-compliant) Jaipur and Uttar Pradesh (penalty = 200%); West Bengal (penalty = 150%)
3	Assistance to owners	Owners	Assistance to owners through Your Energy Savings and Your Home online portals	Australia

Green label for company
ESCO audit capacities

Tentative Policy Touch Points

- **Realizing stakeholder goals**
 - Annualized direct support from state / central government to enable pre-certification monitoring (engagement of consultants / capacity building)
 - Property tax rebate to be offset with additional FAR
 - Convergence across narratives of power, climate and housing at local and meta levels
 - Institutional design for fast track approvals / single window clearances
- **Company level labelling system**
 - Viability Gap Funding (VGF) for green companies
 - Interest rate subvention based on label rating
 - Label rating linked to penalties
- **ECBC audit**
 - Develop ESCOs capacity in residential sector
- **Tax rebates for sustainable materials, equipment & technologies**
 - Implications of emerging regulatory, financial and tax regimes

ABOUT ECO-CITIES INDIA PROGRAM

Eco-Cities India is a multi-year technical advisory program under the EU-India Cooperation on Clean Energy and Energy Efficiency that is focused on five Indian cities – Bengaluru, Bhubaneswar, Chennai, Mumbai Metropolitan Region, and Pune Metropolitan Region. The Program aims to regulate the efficient use of resources and promote the acceptance of clean energy for a sustainable future. The program has advisory interventions in four key sectors of city urbanization - transport, green buildings, water and waste management, and energy efficiency and renewable energy.

ABOUT SUSTAINABLE HOUSING LEADERSHIP CONSORTIUM (SHLC)

IFC has convened a voluntary collaborative effort with leading Indian housing sector companies (Godrej Properties, Mahindra Lifespace Developers, Shapoorji Pallonji Real Estate, Tata Housing Development Company and Value Budget Homes) to form an industry-led Sustainable Housing Leadership Consortium (SHLC).

The SHLC members have committed to make 100 percent of their own housing portfolio sustainable through appropriate green-building certifications and also provide leadership and advocacy for broader industry and government policy actions to make 20 percent of India's new housing construction sustainable by 2022.

ABOUT INTERNATIONAL FINANCE CORPORATION (IFC)

IFC (International Finance Corporation), a member of the World Bank Group, is the largest global development institution focused on the private sector in emerging markets. Working with more than 2,000 businesses worldwide, we use our capital, expertise and influence to create markets and opportunities in the toughest areas of the world. In FY17, we delivered a record \$19.3 billion in long-term financing for developing countries, leveraging the power of the private sector to help end poverty and boost shared prosperity. For more information, visit www.ifc.org