



Actor	Levers	Short term milestones	Medium term milestones	2050 Objective		
Government authorities	Control & regulatory instruments	Building energy codes	- Introduce mandatory codes in new and existing buildings - Tighten requirements over time	- Codes to request zero net energy for new buildings	Building energy codes for new and existing buildings are stringent and enforced	
		Appliance standards	- Expand scope of appliance standards & labeling to cover all equipment - Create common standards to enable communication between appliance energy data and utilities	- Introduce and tighten requirements on energy performance over time	- Appliance energy use is minimized - Standards are stringent and enforced - Information flows between utilities and appliances	
		Energy performance labeling & measurement	- Create labeling regulation (e.g. EU Energy Performance Certificates) - Define and enforce common energy use measurement system that include kWh/m ² .year, total kWh and kWh/person.year	- Mandate energy label in every country - Develop "carrot and stick" measures based on label - Mandate retrofit or replace poor performing buildings based on label and actual energy use	- Labels set conditions for subsidies and other benefits or constraints	
		Energy performance audits	- Introduce energy performance inspections into health & safety procedures for existing commercial buildings - Train inspectors & carry out labeling of existing building stock - Introduce energy audits for new buildings (like structural checks)	- Carry out regular inspections in commercial buildings - Carry out energy audit of all existing buildings	- All buildings have been audited - Regular audits are mandatory - Energy audits are recognized and accurate	
		Metering	- Mandate individual metering and controls in multi-tenant residential buildings, offices & retail - Set fast track applications for low energy buildings - Set energy performance as selection criteria in public procurement	- Inspect metering and controls compliance - Ensure that energy efficiency is a key consideration in all purchases by the government	- All residential and commercial units have individual metering and controls Not applicable if proposed codes and regulations are enforced	
		Procurement	- Create empowered body to remove legal constraints that would hamper energy retrofits (e.g. voting rights, envelope ownership, allow new building lines for insulation, etc.)	- Body to implement changes in the legal framework	- Legal barriers to energy efficiency are removed	
		Legal	- Create mechanism to reward utilities for end-user energy savings		- Utilities have included end-user energy savings in their business model	
	Economic & market-based instruments	Utilities	Set targets on real estate portfolio based on energy performance for pension funds and other large investors and property owners	- Tighten target over time - Control target compliance	- Institutional investors demand energy efficient buildings	
		Urban planning	Set new rules that incentivize energy efficient developments (e.g. vary density depending on building energy performance)		- New zero net energy buildings replace existing inefficient buildings	
		Fiscal instruments & incentives	Capital subsidies, grants, subsidized loans, taxes etc.	- Introduce direct subsidies on first cost only for holistic retrofit packages - Grant tax exemptions based on a building's energy performance improvement - Incentivize renewable energy solutions for communities - Incentivize best available technologies to promote innovation and performance	- Subsidize zero net energy new buildings - Introduce a price of carbon as a mean to fund subsidies of energy efficient new buildings - Use sustained price signals on energy to increase the amount of financially justified efficiency investments	- Financial support / penalties are linked to actual energy performance and improvements. - Poor performing buildings are replaced by new zero net energy buildings
			Research & development	Subsidize R&D programs for new designs, technologies & materials for energy savings & support the transition from late-stage R&D to commercialization	- Maintain subsidies as needed to achieve significant cost and performance improvements of the most promising technologies	R&D delivers high performing materials and equipments that enable zero net energy buildings
			Tenant behavior	Property tax reduction for energy efficient behavior compared to building's label expected performance		Tenants are incentivized to become more energy aware and to reduce energy consumption
		Support, information & voluntary action	Education & training for professionals & the general public	- Launch extensive training programs for professionals - Communicate energy usage and performance information for all public buildings - Launch sustained information campaigns on energy use and savings in buildings	Introduce energy awareness courses in education programs	A new energy aware culture exists amongst citizens
			Education, training and communication	- Take part in the education & training effort needed to promote energy savings for owners, users & facility managers - Communicate energy performance targets of new developments		Developers understand and value energy efficiency and include it in projects as standard practice
Developers	Finance	- Address split incentive problem by engaging with new tenants to share cost and benefits of energy savings investments - Adopt lifecycle cost approach when taking design decisions - Demand preferred financial conditions from capital providers for near zero net energy new developments	- Demand preferred financial conditions from capital providers for near zero net energy refurbishments	Developers have financial interest to develop energy efficient buildings		
	Specifications	- Set ambitious energy performance target as primary design goal - Require the use of energy management systems and individual metering	- Tighten targets for building operations & performance - Use Integrated Design Contract (IDC) tender format with emphasis on energy performance requirements	Developers include ambitious energy efficiency targets as primary design goals		
	Procurement	- Restructure contractual terms to encourage early contractor involvement as part of the design team - Base design team fee structure and incentives on successful energy performance	- Introduce specific decision making process on all components that affect operational energy use	Developers include ambitious energy efficiency targets in their procurement process		
	Education, training and communication	- Take part in the education & training effort on energy efficiency - Voluntarily adhere to a globally recognized principles or codes of conduct - i.e. Principles for Responsible Investment (UNEP/Global Compact) or The Equator Principles - Transparently report on energy efficiency practices - Actively engage owners/fund managers in dialogue around energy efficiency	- Publicly share best practices			
Investors	Specifications	- Evaluate risks using broader measures such as energy price/availability, climate change, regulation - Add energy efficiency metrics and goals to investment practices - Explicitly require disclosure of energy efficiency strategies. - Rank potential investments based on expected performance.- Target fixed income investments in securities that address energy efficiency	- Actively seek creation of securities (new constructions or energy efficient retrofits) backed by certified energy efficient buildings or cash flow from energy savings	Utilities promote a new energy aware culture amongst customers and other stakeholders		
	Asset portfolio	- Benchmark existing portfolio through energy audits of managed/owned properties to identify most obvious targets for energy efficiency improvements - Review portfolio exposure to regulatory, reputation & environmental risk associated with climate change - Set targets on number of owned/managed buildings based on their energy performance - Explicitly incorporate energy efficiency goals into portfolio management - Evaluate investments on the basis of risk/return	- Tighten targets on number of owned/managed buildings based on their energy performance - Increase performance standards for owned/managed building operations and performance			
	Finance	- Include energy performance in property valuation method - Deposit available cash in financial institutions who have lending programs targeted at energy efficiency retrofits - Use energy efficiency analysis to enhance traditional decision-making. - Target investment funds that focus on energy efficiency - Robustly model risk/returns - including first costs, operating costs, savings & sale value/reversion based on supply/demand, quality, design, identity, brand	- Adopt lifecycle cost approach to investment decisions - Assign value to energy efficiency through financial mechanisms and funding sources			
	Education, training and communication	- Stimulate customers to save energy by launching information campaigns, providing advice and launch sustained advertising campaigns - Take part in the education and training effort needed to promote energy savings and efficiency	- Regularly survey customers and craftsmen to understand their knowledge and information needs with respect to energy efficiency - Reinforce current knowledge and deliver new information on a regular basis	Utilities promote a new energy aware culture amongst customers and other stakeholders		
	Distribution network	- Develop smart meters for improving knowledge of final energy use - Transition to smart electricity grid using digital technology to save energy	- Provide customers with smart solutions to promote energy efficiency - Develop smart boxes to manage energy use - Integrate more local renewable energy with centralized low carbon energy systems where possible	Utilities manage existing smart grids		
Utilities	Commercial offer	- Develop pricing schemes that incentivizes energy savings - Launch commercial offers to promote energy savings i.e. energy audits, consulting, technical support with energy efficient solutions, financial support - Develop Energy Performance Contracting (EPC), i.e. schemes enabling energy services companies (ESCO) or other players to offer innovative contracts guaranteeing the level of services and energy savings to the customer - Develop financing schemes on investments with return on energy savings	- Maintain successful commercial offers and adjust them to changing customer needs	Commercial offer and pricing rewards energy savings		
	Demand side management	- Incorporate tools to allow local feedback to end users on consumption and expenses	- Integration of technology to allow information transfer between equipment and systems - Allow metering and bi-directional utility power flow	Peak demand is better managed and the smart grid optimises energy flow between suppliers and customers		
	Energy mix	- Make energy generation evolve towards lower carbon content - Invest in renewable energy solutions for buildings	- Execute strategy for lowering carbon content of existing generation and bringing clean generation assets on line	Energy mix has lowest possible carbon content		
	Education, training and communication	- Provide contractors and end-user with training and operations	- Ensure all customers receive & understand information & training - Simplify products where feasible to lower the skill level necessary for use	Suppliers understand the crucial role they play, in developing an energy aware customer base		
	Appliance standards	- Develop international definitions, standards & metrics - Cooperate with government authorities to create appliance standards and labels	- Adopt standards in all countries - Equip appliances with information sharing capability for utilities	- Compliance to highest appliance standard		
	Marketing	- Develop marketing campaigns to promote building's energy performance rather than single components - Revisit equipment pricing in line with energy efficiency	- Sustain awareness throughout customer base	Suppliers join forces with government authorities in favor of energy efficiency		
Suppliers and manufacturers	Research and Development	- Increase efficiency of current equipment - Develop economical new technologies and applications to support zero net energy buildings - Integrate technology to allow information transfer between equipment and systems - Provide tools to allow local feedback to end users on consumption and cost	- Phase-out low performing equipment - Incorporate new technologies into product lines for common use - Bring to market metering and controls to management energy efficiency	Suppliers provide market with affordable next generation energy efficient solutions		
	Education, training and communication	- Enroll in energy efficiency training program - Include energy efficiency in educational programs and training to owners and occupiers - Reward those who attain a high level of proficiency - Provide voluntary certifications for projects to promote energy efficient constructions and use	- Support continuing education on energy efficiency, eventually making it an essential job requirement or performance criterion	- Designers and contractor implement energy efficiency as a standard practice		
	Design process	- Apply common measurement system - Adopt an integrated design process (IDP) with design team - Promote use of energy efficient design and technologies - Incorporate ICT into design & construction process - Consider energy performance-based fee structure	Adopt IDC (Integrated Design Contract) format with emphasis on energy performance requirements	Zero net energy designs are the norm		
	Design	- Develop holistic approach of energy efficiency in design - Use passive design strategies as first step toward improving energy efficiency - Develop energy efficient design solutions for retrofits - Implement energy efficiency in all new constructions - Plan local energy production to minimize requirements for grid energy where efficient and environmentally responsible - Design new buildings for flexibility and ease of implementation in future retrofits and alternative uses	Adopt new available efficient technologies and design	Know how on zero net energy buildings is widely applied across the sector		
Occupiers	Education, training and communication	- Require information on energy performance through voluntary certification systems and programs - Receive training in how to operate one's building(s)	- Acceptance of new energy efficiency features, including those that affect appearance	- Building occupants fully comprehend and value energy efficiency		
	Behavior and mindset	- Raise demand for high performing buildings - Recognize personal behavior as the first step towards reducing energy usage - Develop energy aware culture and respond to information about personal behavior and effect on energy usage	- End-users recognise change in demand	Occupiers are at the origin of a new energy aware culture		