

Toolkit: Energy efficiency policies and target setting

Buildings

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Buildings energy efficiency sessions in partnership with:





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Energy Efficiency Training Week: Buildings programme



- 1. Where to start: Energy use in buildings
- 2. Where to start: Energy efficiency potential in buildings
- 3. Toolkit: Energy efficient building design
- 4. Toolkit: Energy efficient building technologies

Special session. Technology demonstration **Where do I get help?** IEA's Technology Collaboration Programmes

- 5. Toolkit: Energy efficiency policies and target setting
- 6. What are the steps? Enabling investment with energy efficiency policies
- 7. What are the steps? Implementing building energy codes and standards
- 8. What are the steps? Building operations and procurement

Special session. The multiple benefits of energy efficiency

- Did it work? Evaluation and energy efficiency indicators
 Where do I get help? International and regional energy efficiency initiatives
- **10. Energy efficiency quiz:** Understanding energy efficiency in buildings



5. Toolkit. Energy efficiency policies and target setting

Trainers: Brian Dean and Maxine Jordan

Purpose: To teach the fundamentals of how energy efficiency targets and policies can be used in tandem to reduce energy use in buildings and meet energy and development goals.

Scenario: There has been a change of government and the incoming government wants a range of options for interventions to rapidly increase energy efficiency. *How do you identify, prioritise and quantify these policy options?*



Why do we need policies

Bridging the gap

Enable market transformation



Why do we need policies?





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Why do we need policies? Bridging the efficiency gap





Source: Institute for Building Efficiency, WRI

Why do we need policies? Market transformation



Mandatory regulation

- **Codes:** regulation for energy efficiency and sustainability for a whole building.
- **Standards:** regulation for individual products or services, often referenced within a building code for individual building components.
- **Mandatory disclosure:** regulation that requires organisations or individuals to report or disclose how their building is performing, such as disclosing the energy performance certificate or energy usage.

Obligations

- **Utility obligations:** rules for regulated utilities that enable increasing investment in energy efficiency and passing the costs system-wide in the energy prices
- **Public procurement:** rules for government organisations to purchase products and services that meet certain criteria, such as energy performance or certification.



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Data and information

- Energy performance certificates: documentation of basic building information plus energy performance
- **Building passport:** documentation of most buildings data and information, including basic information, construction materials, systems, renovations and energy use.

Awareness

• Labels and branding: easily identifiable visual that enables consumers to recognise product or service as efficient.

Capacity building

- Education and training: learning efforts to increase the knowledge of building sector professionals or general population.
- Labour certification: searchable documentation of professional expertise in delivering energy efficiency.



Non-financial incentives

- **Time:** expedited approval for permits
- **Scope:** increased floor area, building height or number of floors

Financial incentives

- **Finance:** enabling private investment ,including through loan guarantees, preferential loan terms or increased access to funds
- Direct fiscal credit: improving the cost of energy efficiency to consumers through rebates, tax credits and discounts



Policy Recommendations

25 Energy Efficiency Policy Recommendations







Buildings

- 6 Mandatory building codes and MEPS
 - Net-zero energy consumption in buildings
- 8 Improved energy efficiency in existing buildings
- Building energy labels or certificates
- **10** Energy performance of building components and systems



Buildina

Cross-sectoral



Appliances and equipment



Lighting



Transport



Industry

Energy utilities

25 energy efficiency policy recommendations



Cross-sectoral	Lighting
 Energy efficiency data collection and indicators Strategies and action plans; 	14. Phase-out of inefficient lighting products and systems; 15. Energy efficient lighting systems
 Competitive energy markets with appropriate regulation; Private investment in energy efficiency 	Transport
Monitoring, enforcement and evaluation of policies and measures.	16. Mandatory vehicle fuel efficiency standards; 17. Measure to improve vehicle fuel efficiency;
Buildings	18. Fuel-efficient non-engine components 19. Improved vehicle operational efficiency through Eco-driving
Mandatory building energy codes and minimum energy performance requirements;	and other measures . 20. Transport system efficiency
7. Aiming for net zero energy consumption in buildings;8. Improving the energy efficiency of existing buildings;	Industry
 Building energy labels or certificates; Improved energy performance of building components and systems. 	21. Energy Management in industry; 22. High efficiency industrial equipment and systems; 23. Energy efficiency services for small and medium enterprises;
Appliances and Equipment	24. Complementary policies to support industrial energy efficiency
11. Mandatory MEPS and labels for appliances and equipment;	Energy utilities
and equipment 13. Market transformation policies for appliances and	25. Energy Utilities and end-use energy efficiency.
equipment	

Energy efficiency policy recommendations



#6 Mandatory building energy codes and minimum energy performance standards

- New buildings & buildings undergoing renovation
- Building envelope and equipment
- Energy codes and minimum energy performance standards (MEPS)
- Enforced and regularly strengthened
- To minimise life-cycle costs.



www.iea.org/topics/energyefficiency/

Energy codes for buildings







Nearly two-thirds of countries do not have mandatory building energy codes in place today.



#7 Aiming for net-zero energy consumption in buildings

- Governments should support and encourage
- Make commonly available, when economically viable on a life-cycle cost basis
- Set targets for market share for new construction by 2020
- Set future building codes and MEPS based on net-zero building standards





#8 Improving the energy efficiency of existing buildings

- Ambitious timeline and renovation rate
- MEPS for and significant improvements to building envelopes and systems during renovations
- Energy audits, energy ratings and energy performance certification
- Finance and incentives to encourage investment to increase market penetration of long-lasting high efficiency improvements
- Training to improve building retrofit services
- Improvements to the efficiency of public-sector buildings

Energy efficiency policy recommendations

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#9 Building energy labels or certificates

- Governments should require building energy performance labels or certificates
- To provide information to owners, buyers and renters.
- At sale or rental

Energy Performance Certificate (EPC) 17 Any Street, District, Any Town, B5 5XX Dwelling type: Detached house Reference number: 0919-9628-8430-2785-5996 Date of assessment: 15 August 2011 Type of assessment: RdSAP, existing dwelling Date of certificate: 13 March 2012 Total floor area: 165 m² Use this document to: Compare current ratings of properties to see which properties are more energy efficient. Find out how you can save energy and money by installing improvement measures Estimated energy costs of dwelling for 3 years £5.367 Over 3 years you could save £2.865 Estimated energy costs of this hon

	Current costs	Potential costs	Potential future savings
Lighting	£375 over 3 years	£207 over 3 years	
Heating	£4,443 over 3 years	£2,073 over 3 years	
Hot water	£549 over 3 years	£222 over 3 years	save £2.865
Totals:	£5,367	£2,502	over 3 years

These figures show how much the average household would spend in this property for heating, lighting and hot water. This excludes energy use for running appliances like TVs, computers and cookers, and any electricity generated by microgeneration.

Energy Efficiency Rating



Top actions you can take to save money and make your home more efficient

Recommended measures	Indicative cost	Typical savings over 3 years	Available with Green Deal
1 increase loft insulation to 270 mm	£100 - £350	£141	0
2 Cavity wall insulation	£500 - £1,500	£537	0
3 Draught proofing	£80 - £120	£78	0

See page 3 for a full list of recommendations for this property.

To find out more about the recommended measures and other actions you could take today to save money, visit www.direct.gov.uk/savingenergy or call 6300 123 1234 (standard national rate). When the Green Deal launches, it may allow you to make your home warmer and chaeper to run at to up-front cost.

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ENERGY STAR is a voluntary label for market transformation that has been developed as a brand.





Energy efficiency policy recommendations



#10 Improved energy performance of building components and systems to improve the energy performance of all buildings

- Windows and other glazed areas
 - Maximum share of glazed area
 - MEPS for windows to minimise life-cycle costs
 - A requirement for performance labelling
 - Standard test protocols and certified product testing
- HVAC systems
 - MEPS for HVAC systems to minimise life-cycle costs
 - A requirement for energy efficiency labelling
 - Information and training for building designers, owners and others
 - HVAC systems size, installation, testing and maintenance
- Energy management and control systems

Online resource: IEA's Policy Pathway series







Target Setting

Targets matter Using roadmaps National targets



Targets Matter - What is committed (and visible), gets managed



Of over 3,000 respondents from 10 countries....



Percent that have invested in energy efficiency or renewable energy in past 12 months:

Average number of energy efficiency measures adopted in the last 12 months:

Percent that plan to increase investment in energy efficiency or renewable energy in next 12 months:







Source: Johnson Controls, 2013 Energy Efficiency Indicator Survey



Stakeholders engagement

- **Information collection:** opportunity to gain feedback on needs and goals
- Consensus building: while not everyone will agree, effective stakeholder engagement processes will build trust

Data and information

- **Information collection:** building on the information from stakeholders
- **Market analysis:** to understand the current market conditions and opportunities

Develop a roadmap

- Targets and timelines: setting achievable and aspirational targets and timelines to progress on energy efficiency policies
- Methods and key actions: identifying the tools and resources to make the targets achievable

Target setting: example in Jakarta, Indonesia



JAKARTA GREEN BUILDING

GRAND DESIGN	REGULATIONS	USER GUIDE	ACHIEVEMENT	QUOTES	NEWS	USEFUL LINKS	CONTACT	INDONESIA
V	ISION		М	ISSION	I		G	OAL
<i>The Cente</i> Gree imple In	To be <i>The Center of Excellence of</i> Green Building implementation in Indonesia.		100% new buildings and 60% existing buildings meet Jakarta Green Building compliance in 2030		3	3.785 GWh energy saving 2,4 billion liters water saving 3,37 million tons CO2e		

Source: http://greenbuilding.jakarta.go.id/index-en.html

2007 Target: **resulted in 32% improvement** over two code cycles. More energy savings than any period since 1975.



Buildings and Construction Roadmap template



Methodology and template:

- A template has been created for use by any organisation or government.
- Based on work through the Global Alliance for Buildings and Construction (GlobalABC).
- To enable the development of meaningful targets and timelines to achieve low-emission, efficient and resilient buildings and construction.

Buildings and Construction Roadmap template



8 main actions:

- Urban planning
- New buildings
- Existing building retrofits
- Existing building operations
- Systems
- Materials
- Resilience
- Clean energy

2 supporting sections:

- Multiple benefits
- Capacity building

Buildings and Construction Roadmap template



Each of the 8 main actions include:

- Key actions
- Stakeholders
- Policy
- Technology
- Finance
- Capacity building
- Multiple benefits

Each category includes:

- Current status
- Achievable targets
- Aspirational targets

Building energy codes roadmap: example from Mexico



	2017 2020		2030	2050
	Short-term M	ledium-term	Long-term	
Capacity Building	Program for certification and training of professionals, labelling buildings and awareness plan	Program to train cities and bu energy codes, energy labelling zero emission buildings	uilders on building g and to pilot net Program to train cities and builders on net zero emisssion buildings	
Development	National model model code savings stretch	10% saving model code & 20% savings stretch	20% saving model code & 40% stretch30% saving model code & 60% stretch40% saving model code & 80% stretch50% saving model code & NZEB stretch	
Adoption	Model code adoption: 7 cities Stretch code adoption: 3 cities	Model code adoption: 100 Stretch code adoption: 20	Model code adoption: 200 Stretch code adoption: 40 Adoption of building energy codes by 100% of local jurisdictions.	
Enforcement	>50% verification and certification of compliance with adopted building energy code	>75% verification and certification	>95% verification and 100% verification and certification	
Review & Update	Evaluation of code adoption and enforcement of model and stretch codes with recommended updates	Evaluation of code adoption and enforcement with recommended updates	Evaluation of code adoption and enforcement with recommended updatesEvaluation of code adoption and enforcement with recommended updatesEvaluation of code adoption and enforcement with recommended updates	nt



Policy Making

Stakeholders

Group exercise



Who: Stakeholders involved in governance of buildings





Source: WRI, 2016, Accelerating Building Efficiency: Eight Actions for Urban Leaders

Who: Stakeholders influence action across building lifecycle



N	EW BUILDING	3 S	EXISTING BUILDINGS				
Land Use/ Planning	Design	Construction	Sale or Lease	Tenant Build-Out	Operations & Maintenance	ダダダ ダダダ Retrofit	Demolition & Deconstruction
Local governments	Design & construction professionals	Design & construction professionals	Buildings owners and managers	Buildings owners and managers	Buildings owners and managers	Buildings owners and managers	Design & construction professionals
Developers and self-help builders	National and provincial governments Local governments	Building investors Suppliers & manufacturers	Developers and self-help builders Building occupants	Building occupants Design & construction professionals	Energy utilities Building occupants	Building investors Building occupants Design & construction professionals	Buildings owners and managers

Source: WRI, 2016, Accelerating Building Efficiency: Eight Actions for Urban Leaders



- **Responsibility matrix:** also known as the RACI (Responsible, Accountable, Consulted, Informed) matrix. This tool can be used with stakeholders to clearly identify which roles are appropriate for each stakeholder throughout the roadmap development and implementation process
- **Gap analysis:** can be used to identify where there is potential for improvement to move from the current situation to the desired market for energy efficiency
- SWOT (Strengths, Weaknesses, Opportunities and Threats) analysis: building on the gap analysis, a SWOT analysis can be done in a collaborative setting with stakeholders to better understand what opportunities can drive energy efficiency and what weaknesses can be addressed with further capacity building
- **PIE (Progress, Impact, Effort) multi-matrix:** such as the Building Efficiency Policy Assessment Sheets developed by the Building Efficiency Initiative at Johnson Controls, can be used to enable stakeholder discussion on the current level of progress with a policy, technology or programme approach and then to identify how important the impact can be for each approach and the level of effort needed to make the approach successful. This information can then be used to recommend targets and timelines.



Scenario:

There has been a change of government and the incoming government wants a range of options for interventions to rapidly increase energy efficiency.

How do you identify, prioritise and quantify these policy options?

Group Exercise:

- You have the opportunity to consult with key stakeholders on <u>prioritising</u> energy efficiency policies for buildings.
- We do an online version of a platform created to engage stakeholders on energy efficiency.



• **Responsibility matrix,** also known as the RACI (Responsible, Accountable, Consulted, Informed) matrix.

	Country	City	Architect	Engineer	Developer	Manu- facturer	Owner	Installer
Codes	R	А	С	С	I	С	I	С
Design		I	R	А	С		С	I
Construction		I	А	А	R		I	R
Technologies	А		I	I	I	R	I	С
Operations			А	А	R	А	R	А
Retrofit			С	С	R		R	А

Stakeholder engagement tools: Responsibility Matrix

	CODES	TARGETS	FINANCE/ INCENTIVES	INFORMATION/ CERTIFICATIONS	CAPACITY BUILDING/ SERVICE DELIVERY
Local government					
National/state government					
Utilities					
Building owners, managers and tenants					
Financial service providers					
New building service providers (architects, developers, contractors, vendors, etc.)					
Existing building service providers (contractors, auditors, ESCOs, etc.)					

MORE IMPORTANT

Source: WRI, 2016, Accelerating Building Efficiency: Eight Actions for Urban Leaders

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- **Gap analysis:** can be used to identify where there is potential for improvement to move from the current situation to the desired market for energy efficiency

	Current	Goal
Codes	Voluntary	Mandatory and enforced
Design	Inefficient	Efficient
Construction	Inefficient	Efficient
Technologies	Inefficient	Efficient
Operations	Inefficient	Efficient
Retrofit	No efficiency	Deep efficiency

Stakeholder engagement tools: SWOT analysis



Strengths

- Strong political will
- Technologies are available

Opportunities

- Aligning with global targets
- Efficiency is very cost effective

Weaknesses

- Poor data
- Poor knowledge of the benefits

Threats

- Upcoming election
- Continuous turnover



Building Efficiency Codes & Standards							
Buildir impr req	ng energ oving th Juiremen	y code e effic ts, per	es require minimum iency of new buildir formance requirem	thresholds for ener ngs. Within this cate eents, as well as app	gy efficiency and se gory, we include wh liance, equipment a	rve as a common pol nole building design nd lighting efficiency	licy instrument for and construction y requirements.
			No policy or planning currently in place (1)	Planning to pilot or implement policy (2)	Piloting the policy on a limited basis (3)	Limited or sub- national level implementation (4)	Comprehensive national level implementation (5)
STEP 1	irrent Sta	tus					
m Desi	SI Ti (2 y	nort erm rears)					
BIS Sta	ite Lu Tu (ong erm 10 ears)					
Extre	emely Dif (5)	ficult					
Ver	y Difficul	t (4)					
-	Difficult (3)					
Some	ewhat Di (2)	fficult					
Not	at All Dif (1)	ficult					
BE	fficien itiative	cy	Not at All Important (1)	Somewhat Important (2)	Important (3)	Very Important (4)	Extremely Important (5)









Step 2: identify impact and effort



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Comprehensive

national level













Reporting back: compare impact and effort

Source: Institute for Building Efficiency, WRI



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App results websites



• Policy 1: Building Energy Codes:

- Current status <u>https://api-eur.cvent.com/polling/v1/api/polls/sp-msh793</u>
- Importance <u>https://api-eur.cvent.com/polling/v1/api/polls/sp-j6077m</u>
- Difficulty <u>https://api-eur.cvent.com/polling/v1/api/polls/sp7g1phk</u>
- Desired status in 2 years: https://api-eur.cvent.com/polling/v1/api/polls/sp-atgjsn
- Desired status in 10 years: <u>https://api-eur.cvent.com/polling/v1/api/polls/sp-qje3xv</u>

• Policy 2: Building Energy Labels:

- Current status https://api-eur.cvent.com/polling/v1/api/polls/spb1szc0
- Importance <u>https://api-eur.cvent.com/polling/v1/api/polls/spocef2p</u>
- Difficulty <u>https://api-eur.cvent.com/polling/v1/api/polls/sp-tvar62</u>
- Desired status in 2 years: <u>https://api-eur.cvent.com/polling/v1/api/polls/sp-tsa7qt</u>
- Desired status in 10 years: https://api-eur.cvent.com/polling/v1/api/polls/spvo1uhb

• Policy 3: Energy Efficiency Incentives and Finance:

- Current status https://api-eur.cvent.com/polling/v1/api/polls/sp-yzzpsv
- Importance https://api-eur.cvent.com/polling/v1/api/polls/sp-31d897
- Difficulty <u>https://api-eur.cvent.com/polling/v1/api/polls/sp6p89u3</u>
- Desired status in 2 years: <u>https://api-eur.cvent.com/polling/v1/api/polls/spatedv2</u>
- Desired status in 10 years: https://api-eur.cvent.com/polling/v1/api/polls/speaqxmg