

Energy Efficiency Policies and Measures

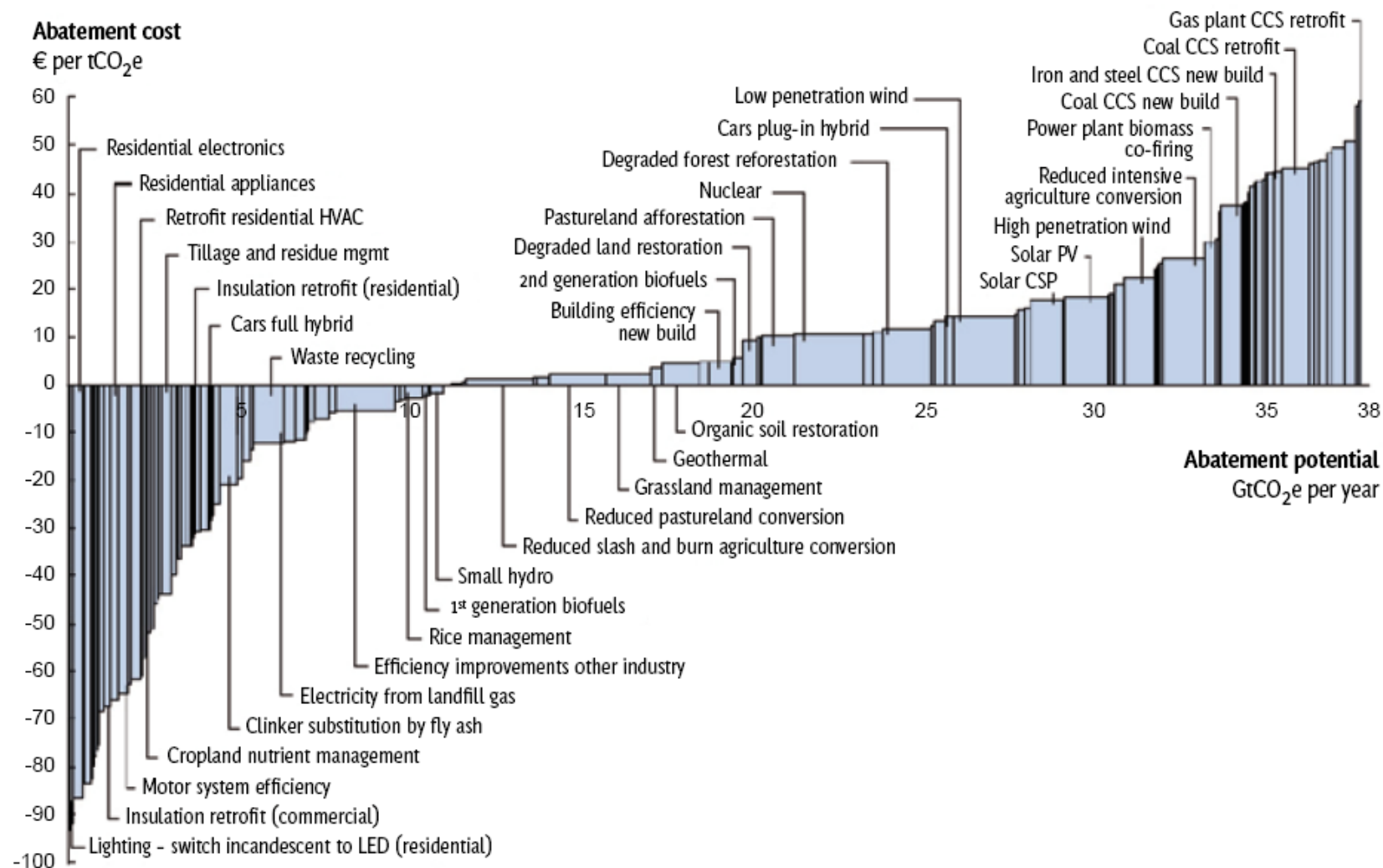
Xianli Zhu

16 March 2021 | Copenhagen

Outline

- Policies and measures for homes and appliances
- Policies and measures for transport, businesses, and industries
- Policies and measures for utilities
- Cross-sectoral policies: governance and finance
- A comparison of the EE policies and measures in different countries - the RISE framework

Global GHG abatement cost curve beyond business-as-usual - 2030

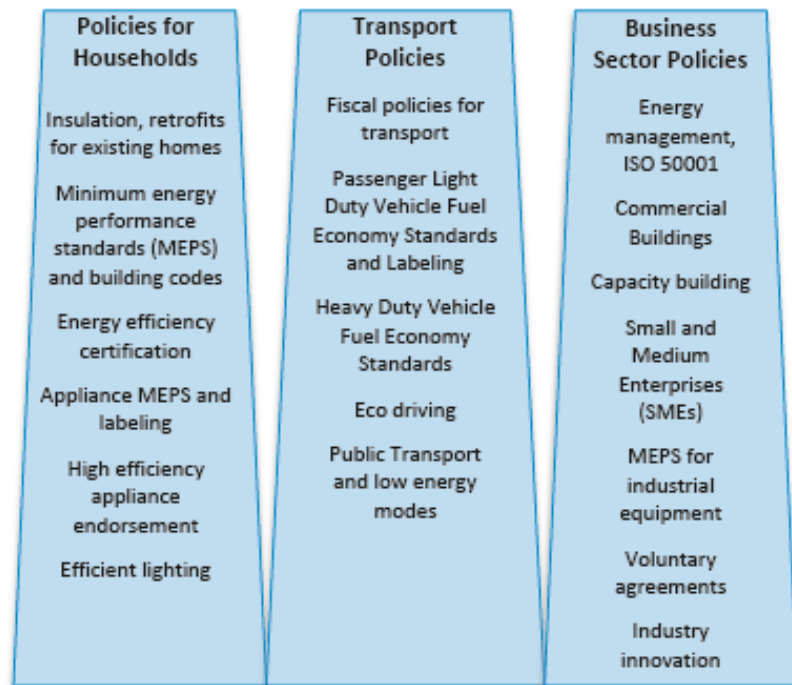


McKinsey, 2009. Pathways to a Low-Carbon Economy. Version 2 of the Global Greenhouse Gas Abatement Cost Curve. McKinsey & Company.

Policies for Energy Efficiency

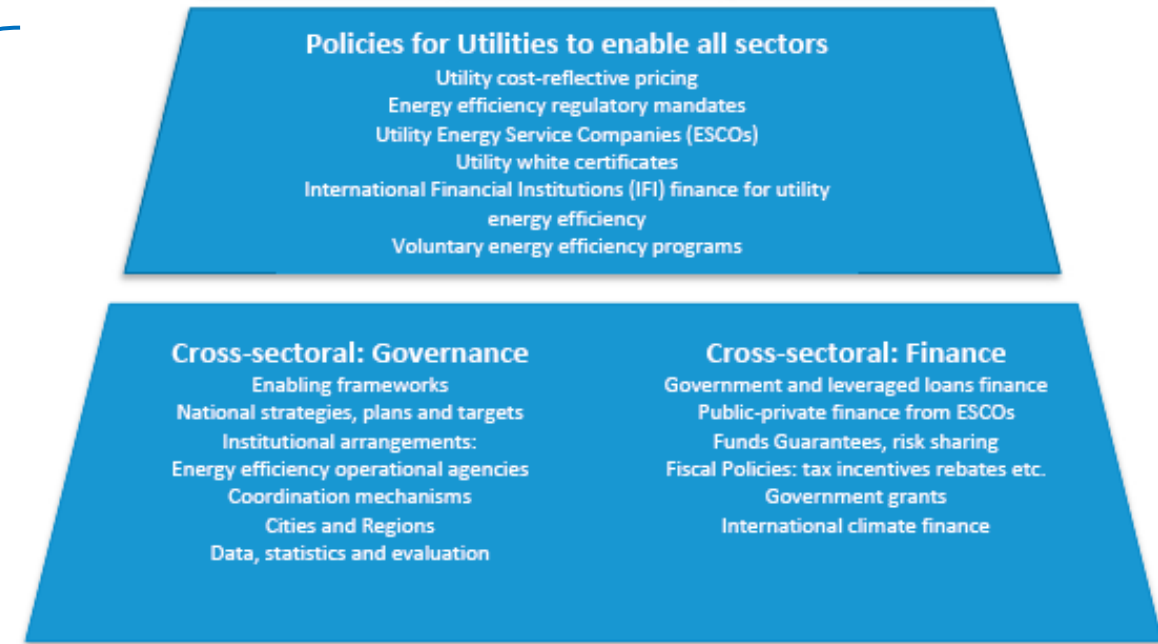
- an overview

Operational policies



Source: UNECE, 2015. Best Policy Practices for Promoting Energy Efficiency

A foundation of cross-sectoral governance and finance policies



Policies for households: Homes and Appliances

- **Existing homes insulation / weatherization.** Includes a wide array of technology options: double glazing, draught sealing, insulation, heating and cooling options, shading, low emissivity coatings for 'cool roofs', lighting and appliance replacement and disposal etc.
- New and existing homes and buildings - Minimum energy performance standards (MEPS) via Building Codes
- Energy efficiency certification of buildings
- MEPS and voluntary S&L for household appliances
- Endorsement of highest efficiency appliances (ENERGY STAR)
- Efficient Lighting (Lighting is 15% of global electricity demand and can be reduced to 10% of current demand).

Buildings policy 'menu'

National level

Sub-national &/or
municipal level

Private sector level

Menu

- ☐ Building codes
- ☐ Energy use reduction targets (net Zero Energy Buildings)
- ☐ Enforcement of building performance regulation
- ☐ Green public procurement
- ☐ Efficiency retrofit program
- ☐ Benchmarking and building energy performance disclosure
- ☐ Feedback programs
- ☐ Industry awards

Appliances policy 'menu'

National level

National & municipal
level

Municipal level

Private sector level

Menu

- ☐ Minimum energy performance standards and labeling
- ☐ Supporting mechanisms (labels, incentives, etc)
- ☐ Monitoring, verification and enforcement
- ☐ Promotion of best-practices, awards

Case for EE standards and labels

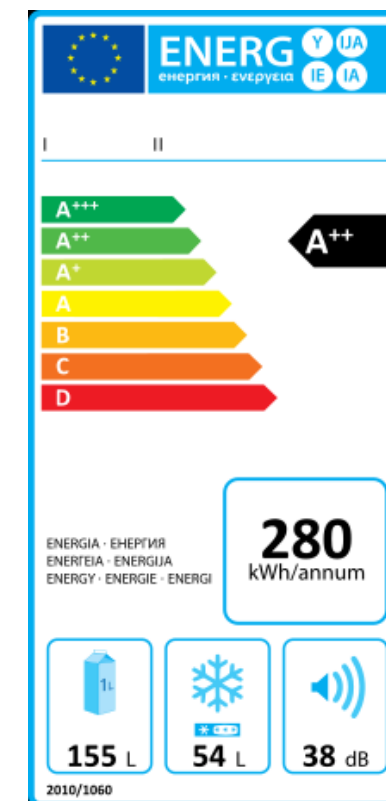
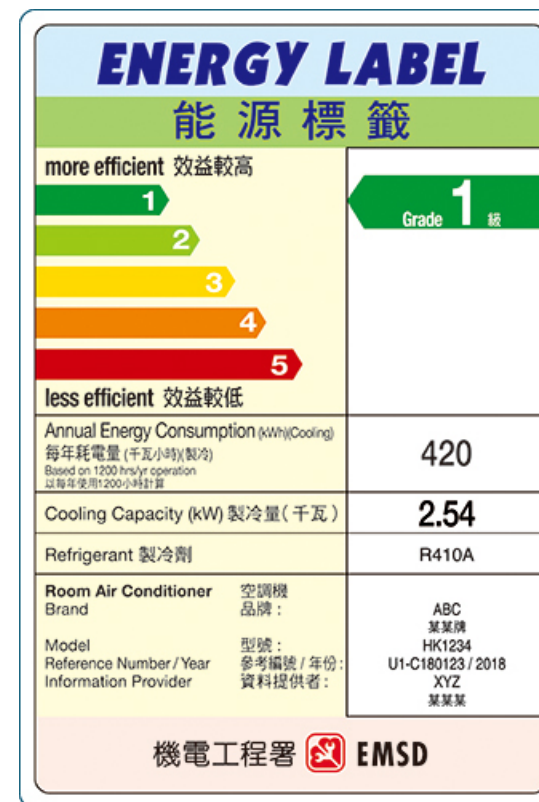
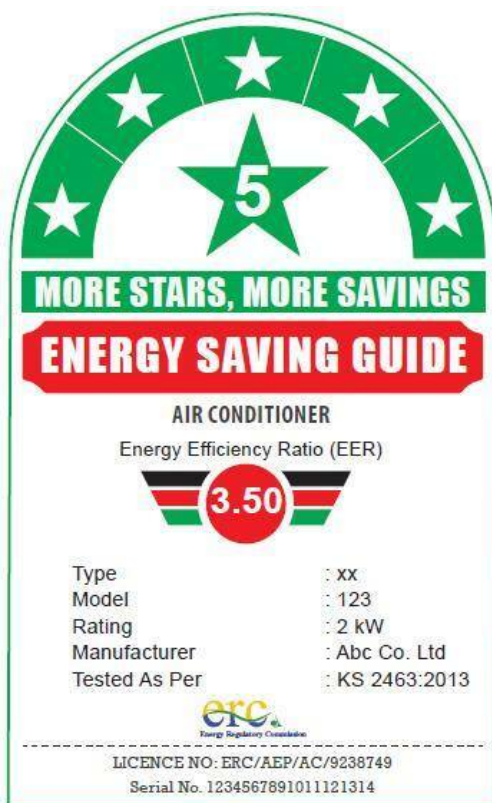
EE S&L:

- Help the market recognise energy performance
- Provide consumers with tool to select products with lower running cost
- Provide manufacturers with tool to differentiate products
- Lead to huge net economic gains (if done properly)
- Lead to important energy and CO₂ savings

Introducing Energy Efficiency Standards and Labels for Appliances and Equipment

- Energy efficiency standards and labels (EE S&L) are sets of procedures and regulations that, respectively, prescribe the minimum energy performance of manufactured products and the informative labels on these indicating products' energy performance.
- They are meant to help the market recognise energy efficiency and act on it.
- Without the information provided by labels, consumers and other end-users are often unable to make an informed decision about the true cost of a product, and manufacturers lack the incentive to improve the energy performance of it as there is no way for the market to recognise and value this aspect.
- Standards can be set to ensure that obsolete and inefficient technology does not continue to dominate the market, much more effectively than is possible by the actions of individual end-users.

Examples of EE labels for appliances



Placement of labels

- Printed self-adhesive label, adhesive tapes, transfix labels, etc.
 - Example: Room AC, Refrigerator etc
- Printing on an anodized name – plate
 - Example: Pumps, Motors etc.
- Printing on products as well
 - Example: Tubular Fluorescent Lamps, LED Bulbs
- The label should be affixed in such a manner that it is not possible to remove the label from the product.
- It should be placed in such a position that it is easily visible.
- Regulations and schedule define material, position and quality of label.

Transport policy 'menu'

National level

Municipal level

Private sector level

Menu

- ☐ Fuel economy standards
- ☐ Fiscal policies
- ☐ Fuel economy labeling

- ☐ Low emission zones/parking fees
- ☐ Improvement of public transport networks
- ☐ Bike lanes

- ☐ Technological innovation program to improve vehicle economy
- ☐ Demonstration of efficiency improvements to consumers

Policies for transport

Transport consumes 27% of global energy with land-based transport responsible for 76% of this. Road vehicles (cars, buses and trucks) make up 94% of land-based transport.

- **Fiscal policies (taxation and user charges) for transport**
- **Vehicle Fuel Economy Standards (VFES) and Labelling**
- **Standards on vehicle emissions**
- **Eco- Driving**
- **Car-sharing**
- **The A-S-I approach** for passenger transport:
 - ✓ Avoid/Reduce the need for travel
 - ✓ Shift/Maintain to public transport and low energy modes
 - ✓ Improve vehicle and fuel efficiency as well as on the optimisation and **innovation** of transport infrastructure.



Policies for the Business Sector – Industry and SME policies

- EE offers a strategic approach to improving productivity in the business sector.
- Governments generally prefer a light-handed approach to working with industry, (particularly with export industries exposed to global market pressures) so effective voluntary measures (or at least measures where the obligation is around cooperation and information) are important policies.
- **Energy Management Capacity Building**
 - In the services and SME sectors building energy use can be reduced by focusing on the commissioning, operations and maintenance of energy intensive, lighting air conditioning and specialist systems.
- **Small and Medium Enterprises (SMEs) and Industry networks.** An important policy area as SMEs provide greater employment and GDP growth potential than energy intensive industries.
- **Mandatory energy audit and energy management** (Energy Management ISO 50001)
- **MEPS (Minimum Energy Performance Standards) for industrial equipment.**
- **Market-based approach:** white certificate and emission trading
- **Voluntary Agreements.**
 - By focusing on large energy industry sectors, governments can help industries
 - Learn from each other about ways in which productivity can be advanced.



Policies and measures for utilities

- Utilities provide the generation, transmission and delivery of electricity, gas, water, heat, and communications services.
- Utilities can motivate economic investment in demand and supply side energy efficiency by implementing cost-reflective prices.
- With established technical, financial, managerial and marketing capabilities, utilities are well placed to deliver energy efficiency policies.
- In many developing countries, utilities are the only agent with all these capabilities and are an essential actor in establishing energy efficiency policies and programmes.
- Smaller countries could usefully start their energy efficiency programmes with utility ESCOs.



Policies for Utilities

Utilities – Cost reflective pricing and energy price subsidy reform

- Shifting energy subsidies to motivate more rational investments reduces demand on public budgets and also enables investment in more economic alternatives like energy efficiency across the entire market.
- The impact of cost reflective pricing is universal.

Energy Efficiency Regulatory Mandates

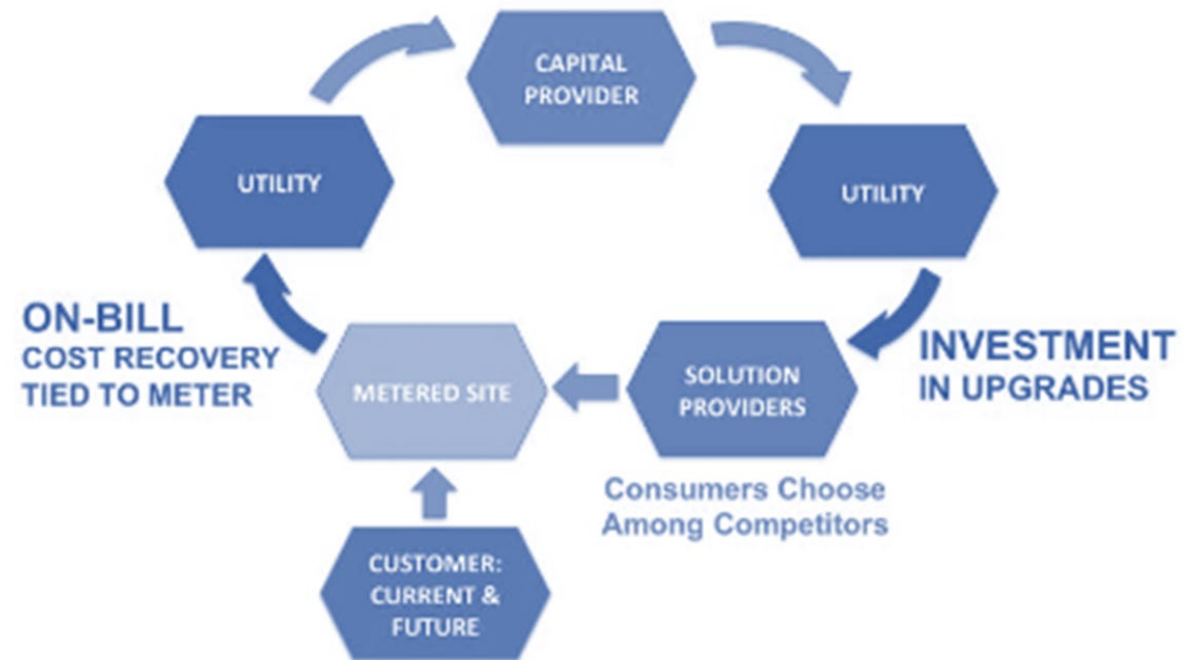
- With direct customer relationships, technical and financial capacity utilities are often the most able to deliver energy efficiency and do it in a way that minimizes other resource costs.
- Utility led programmes impact across entire customer classes in an economy and can send powerful motivations with smarter tariffs and Demand-side Management (DSM) activities.

Utilities – Voluntary Energy Efficiency Programmes

- Including reductions in transmission and distribution losses
- When facing system constraints, utilities can be highly motivated to offer low cost solutions to traditional supply-side investments by developing demand-side capacity.
- Time-based electricity tariffs to reduce peak load and increase generation capacity utilization rate.

Policies and Measures for Utilities - Utility ESCOs

- Combination of utility marketing, customer relationship and entrepreneurial ESCO behaviour seems to work.
- Getting efficient energy using devices or equipment, such as CFL/LED bulbs and electrical appliances to the users; the users continue pay the agreed electricity bill for certain period of time; upon end of the period, the devices/equipment ownership is transferred to the users



Cross-sectoral policies: governance

National Strategies, Plans and Targets

- Well-designed policies, actions, targets and costs ensure consistent resourcing and outcomes.
- Integrated energy efficiency into effective policies and regular review ensures best outcome for applied resources.

Energy Efficiency Operational Agencies

- An EE agency works alongside other central, regional, and local agents to enable an effective implementation at all levels of society.
- **Co-ordination Mechanisms** are designed to integrate and coordinate efforts by different players to maximize the impact from each player in society.

Public Sector Energy Efficiency, Cities and Regions

- Integrating energy efficiency criteria in public procurement

Data, Statistics and Evaluation

- Reliable and timely end use data is essential to sound policy design and programme application and underpins success.

Cross-sectoral policies: finance

- Government budget and grants
- Dedicated credit lines
- Public – Private Finance, Including ESCOs
- Fund Guarantees and risk sharing for EE
- Fiscal Policies (Tax incentives and rebates)
- International Climate Finance and Carbon Finance
- Leverage private investment



Factors to be considered in national EE policymaking

- The policies form a menu from which countries can select a suite of best practices that best suit their political, market and cultural contexts.
- While it would not be expected that country might adopt all the policies offered here, a government should also consider that an effective programme of policies should include:
 - necessary governance foundations in statute, coordination mechanisms, data, and operational capabilities;
 - an ability to access and utilize private finance;
 - a role for utilities in motivating rational use of energy resources and transmission systems;
 - measures that span the sectorial mix and priorities in a country;
 - learning evaluation and innovation processes.



Comparing the EE Policies of different countries - the RISE framework

- **RISE – Regulatory Indicators for Sustainable Energy** -- assesses countries' policy and regulatory support for each of the three pillars of sustainable energy—access to modern energy, energy efficiency, and renewable energy.
- RISE is a tool developed by the World Bank for policymakers to compare national policy frameworks for sustainable energy and identify opportunities to attract investment.
- RISE indicators are scored between 0 and 100, and all have equal weight when summed to reach a total score for each of the three areas: universal access, renewable energy, and energy efficiency.
- Scores are grouped into three categories based on a “traffic light” system: green for the highest third of scores (67 – 100); yellow for the middle range (34 – 66); and red for the lowest scores (0 – 33).

The Indicators for EE policy evaluation in the RISE

The EE pillar in the RISE 2018 report, **includes 13 indicators and 31 sub-indicators**, with additional indicators spanning heating and transport. These 13 indicators include:

- 1) National energy efficiency planning;
- 2) Energy efficiency entities;
- 3) Information provided to consumers about electricity usage;
- 4) Energy efficiency incentives from electricity rate structures;
- 5) Incentives and mandates: Industrial and commercial end users;
- 6) Incentives and mandates - public sector;
- 7) Incentives and mandates - utilities;
- 8) Financing mechanisms for energy efficiency;
- 9) Minimum energy efficiency performance standards;
- 10) Energy labelling systems;
- 11) Building energy codes;
- 12) Transport sector energy efficiency; and
- 13) Carbon pricing and monitoring.

RISE 2018 Scores

- RISE Scores are indicative, as they are mainly based on a check-list of whether there are certain policies, and do not assess whether the policies are effectively implemented or not

2019 RISE Scores of Kenya and Ethiopia

| | Kenya | Ethiopia |
|--------------------|-------|----------|
| Electricity access | 76 | 78 |
| Energy efficiency | 67 | 29 |
| Renwable energy | 59 | 43 |
| Average | 70 | 50 |

Source: <https://rise.worldbank.org/scores>



Thank you for your attention

c2e2.unepdtu.org/

xzhu@dtu.dk