

Double the global rate of improvement in energy efficiency

## **QUICK FACTS**

- Energy efficiency is the only area that came moderately close to the pace of improvement to meet 2030 objectives but progress remains short of what is needed. Global primary energy intensity improved at 2.1 percent a year in 2012–14, still short of the SEforALL objective of a 2.6 percent compound annual growth rate (CAGR) over 2010–30. Given the underperformance in energy intensity improvement since 2010, the effective target rate for 2014–30 is now higher, at 2.8 percent a year.
- The top 20 energy consuming economies globally –or high impact countries –accounted for more than 75 percent of global Total Primary Energy Supply (TPES). Four countries, China, the United States, India and Russia, accounted for nearly 50 percent of global TPES, with 22 percent attributed to China alone.
- 15 out of 20 high impact countries reduced their intensity over 2012-14. The United Kingdom, Nigeria, China, Italy, Australia, Russia and Mexico reduced their energy intensity by more than 2 percent annually.
- Low Income Countries in Sub-Saharan Africa have the highest energy intensity in the world at 10.3 MJ/2011 PPP\$ in 2014 due to their strong reliance on inefficient traditional biomass. This is compared to the SEforALL objective for global energy intensity of 5.5 MJ/2011 PPP\$.
- Estimates suggest that energy efficiency investment would need to increase by a factor of 3-6 from current levels of \$250 billion a year to reach the 2030 objective.

### CONTEXT

- Energy efficiency offers a huge and growing opportunity for the world to reduce emissions of greenhouse gases.
   The International Energy Agency estimates that global investment in energy efficiency was \$221 billion in 2015, an increase of 6 percent from 2014 and 60 percent greater than investment in conventional power generation.
- Investing in energy conservation measures has the potential to cut fuel import bills, boost the economy and create numerous jobs, and is also essential to address climate change. Energy efficiency measures in International Energy Agency member countries generated energy savings of 450 million tonnes of oil equivalent in 2015 and reduced total energy expenditure by \$540 billion. Even for the least developed countries increasing energy productivity now is a smart concept, as emphasized by multiple Nationally Determined Contributions including Bangladesh, Burkina Faso or Uganda.
- There has been some decoupling of growth and energy demand over 2012-14. In North America, GDP continued to grow while energy demand was falling, notably because of fuel switching from coal to more efficient natural gas in the US power sector. This decoupling effect was evident in the European Union as well as much of the developing world, except for Latin American and the Arab region.
- The intensity of final energy consumption in industry, agriculture, services, and transport are on a long-term downward trend with energy savings seen across the board. The residential sector on the other hand is a large and fast growing segment of energy consumption and is becoming more energy intensive. Improvements in the efficiency of thermal power generation and power networks have been relatively slow.

### ADDITIONAL RESOURCES

Global Tracking Framework 2017

Regulatory Indicators for Sustainable Energy 2017

**SEforALL Africa Hub** 

SEforALL Asia-Pacific Hub

SEforALL Latin America and the Caribbean Hub

Copenhagen Centre on Energy Efficiency

**Appliances and Equipment Accelerator** 

**Building Efficiency Accelerator** 

**District Energy Accelerator** 

**Lighting Accelerator** 

**Transport and Motor Vehicle Fuel Efficiency Accelerator** 

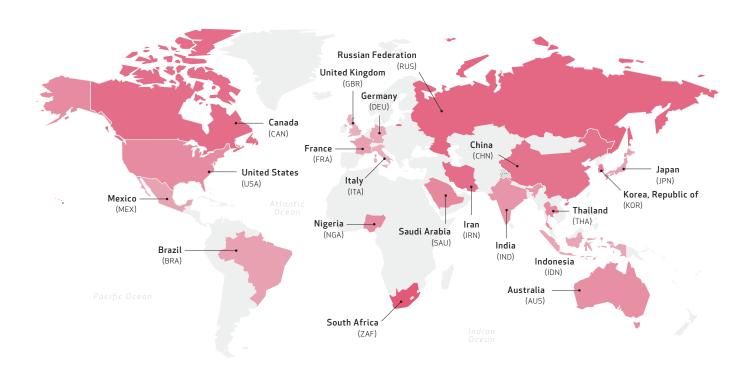
**Industrial Energy Efficiency Accelerator** 

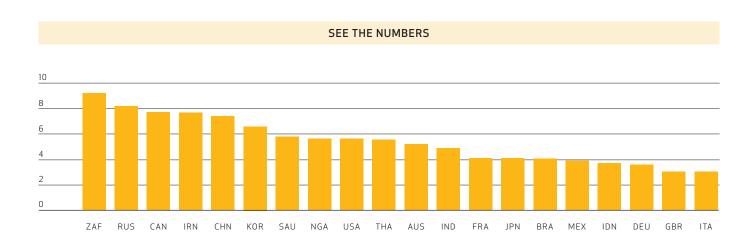
**International Energy Agency** 



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# PRIMARY ENERGY INTENSITY (MJ/PPP \$), 2014





Notes: 1. The dotted line represents approximately the Line of Control in Jammu and Kashmir by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 2. This map was produced by SEforALL. It is based on the UN Map of the World, which can be found here: http://www.un.org/Depts/Cartographic/map/profile/world.pdf. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of SEforALL, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

Sources: International Energy Agency (IEA) and the World Bank. 2017. "Progress Towards Sustainable Energy: Global Tracking Framework 2017" (April), World Bank, Washington, DC. Data extracted from http://gtf.esmap.org/ on 06/20/2017.

# **ENABLING POLICIES**



Which countries have an enabling environment for investment in energy efficiency?

### **QUICK FACTS**

- In 2015, about three-quarters of the countries surveyed in Regulatory Indicators for Sustainable energy (RISE) had legislation or an action plan in place to pursue energy efficiency but only two-thirds had fixed precise targets.
- Barely a third of countries have made serious progress in labeling energy-efficient appliances—or establishing building energy codes for construction or minimum energy performance standards for industry.
- In over three-quarters of countries worldwide, the utility is not a creditworthy entity, and most likely unable to fund new investments from its own balance sheet.
- In a context of fast economic growth and sound nationwide electrification plan in the 1990s, Vietnam had successfully implemented load-shedding incentives in order to avoid a shortage of electrical capacity, in collaboration with the public utility as well as large consumers. Vietnam now scores the highest in the energy efficiency pillar among all developing countries.

### CONTEXT

- RISE offers policy makers and investors detailed country-level insights on the policy and regulatory environment for sustainable energy across 111 countries globally. It shines light on the need to attach greater political and policy priority to energy efficiency. Many countries have few or no policies in place to support energy efficiency.
- Energy security concerns among high income countries in the 1970s spurred efforts to address wasteful energy consumption. Most of those countries now have ambitious policies and incentivizing regulatory environments in place. Leading scorers among developing countries are in Central Asia, in compliance with ambition levels of the EU Energy Efficiency Directive.
- China started introducing energy efficiency measures in the 1980s to minimize energy imports as the economy expanded rapidly. Ambitious targets were set in its 12th Five Year Plan. The Thousand Companies Energy Conservation Action Plan mandates large energy users to conduct energy audits and report regularly. A mandatory labeling system covers products such as refrigerators, air conditioners, lighting equipment and industrial electric motors. Tax incentives, green bonds, and energy service contracts have been important drivers or consumers.
- RISE suggests an important role for utilities in meeting efficiency, as well as access, objectives because of utilities' in-depth knowledge of electricity consumers' habits and because of their own power consumption. Yet only half of RISE countries require their utilities to undertake energy efficiency measures. There is a clear correlation between scoring well on the utilities indicator and scoring well across the board on all other energy efficiency indicators.
- Since the 2011 Arab Spring, Egypt, Iran, Jordan, Morocco, and Tunisia have undertaken major energy subsidy reforms so as to reduce their fuel dependency and are beginning to let stronger price signals incentivize energy savings.

## ADDITIONAL RESOURCES

**Global Tracking Framework 2017** 

Regulatory Indicators for Sustainable Energy 2017

Copenhagen Centre on Energy Efficiency

**SEforALL Africa Hub** 

SEforALL Asia-Pacific Hub

SEforALL Latin America and the Caribbean Hub

**Appliances and Equipment Accelerator** 

**Building Efficiency Accelerator** 

**District Energy Accelerator** 

**Lighting Accelerator** 

<u>Transport and Motor Vehicle Fuel Efficiency Accelerator</u>

**Industrial Energy Efficiency Accelerator** 

**International Energy Agency** 

**Energy Efficiency Facilitating Hub (ECCJ)** 

Regional Economic Commissions

Source: International Energy Agency (IEA) and the World Bank. 2017. "Progress Towards Sustainable Energy: Global Tracking Framework 2017" (April), World Bank, Washington, DC.

Which countries have an enabling environment for investment in energy efficiency?



#### MEDIUM SCORE (66-34)

Significant opportunities exist to strengthen the policy framework

#### LOW SCORE (33-0)

Few or no elements of a supportive policy framework have been enacted OTHER HIGH SCORES

Country received a high score on RISE but is not a high-impact country for energy efficiency

# REGULATORY INDICATORS FOR SUSTAINABLE ENERGY (RISE), OVERALL ENERGY EFFICIENCY SCORE



Notes: 1. Regulatory Indicators for Sustainable Energy (RISE) is a suite of indicators that assesses the legal and regulatory environment for investment in sustainable energy. 2. The dotted line represents approximately the Line of Control in Jammu and Kashmir by India and Pakistan. The final status of Jammu and Kashmir has not yet been agreed upon by the parties. 3. This map was produced by SEforALL. It is based on the UN Map of the World, which can be found here: http://www.un.org/Depts/Cartographic/map/profile/world.pdf. The boundaries, colors, denominations and any other information shown on this map does not imply, on the part of SEforALL, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.

Sources: Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017. Data extracted from http://rise.esmap.org/ on 06/23/2017.

# **ENABLING POLICIES**



Which countries have an enabling environment for investment in energy efficiency?

### **QUICK FACTS**

- Regulatory frameworks in the largest energy consumers in the world, measured in terms of primary energy consumption, tend to be more advanced than average as they have strong incentives to harness energy conservation measures.
- Countries scoring the highest on Regulatory Indictors for Sustainable Energy (RISE) energy efficiency indicators are not necessarily the wealthiest or those that have pursued energy efficiency policies the longest, as suggested by the example of Vietnam. However, Sub-Saharan African countries scored very low for all indicators.
- Among low-income countries, only Ethiopia, Haiti, Tanzania, and Uganda offer financing mechanisms for energy efficiency, with all four offering tax or duty incentives across sectors.

### CONTEXT

- RISE offers policy makers and investors detailed countrylevel insights on the policy and regulatory environment for sustainable energy across 111 countries globally.
- Most countries have integrated energy efficiency in their national energy strategies, have established basic institutions to promote energy efficiency and encourage consumers to use electricity more efficiently. However, more efforts are needed to inform customers on their electricity consumption habits and to regulate activities of energy consumers and suppliers.
- Financing mechanisms in place, including credit lines from banks, energy service agreements, and tax incentives, are distinctive policy elements for high-scoring countries.
   There is generally a strong relationship between wealth and deployment of energy efficiency financing mechanisms.
- There is considerable scope for energy savings through the deployment and enforcement of minimum energy performance standards, particularly for electrical appliances. Building energy codes, which require deep expertise to build and high level capacity among local governments to enforce, are also in place in top scoring, generally high-income, countries only.

### ADDITIONAL RESOURCES

Regulatory Indicators for Sustainable Energy 2017
Global Tracking Framework 2017
Copenhagen Centre on Energy Efficiency
SEforALL Africa Hub
SEforALL Asia-Pacific Hub
SEforALL Latin America and the Caribbean Hub
Appliances and Equipment Accelerator

Building Efficiency Accelerator

<u>District Energy Accelerator</u>

**Lighting Accelerator** 

<u>Transport and Motor Vehicle Fuel Efficiency Accelerator</u>

**Industrial Energy Efficiency Accelerator** 

**International Energy Agency** 

**Energy Efficiency Facilitating Hub (ECCJ)** 



**HIGH-IMPACT COUNTRIES** 

Countries whose efforts are critical to the achievement of SEforALL energy efficiency objectives globally

Which countries have an enabling environment for investment in energy efficiency?

# REGULATORY INDICATORS FOR SUSTAINABLE ENERGY, BY ENERGY EFFICIENCY INDICATOR

KEY

#### MEDIUM SCORE (66-34)

framework

**HIGH SCORE (100-67)** 

Significant opportunities exist to strengthen the policy

LOW SCORE (33-0)

Few or no elements of a supportive policy framework have been enacted

#### Most elements of a strong policy framework to support sustainable energy are in place



Note: Regulatory Indicators for Sustainable Energy (RISE) is a suite of indicators that assesses the legal and regulatory environment for investment in sustainable energy.

Source: Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017.



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REGULATORY INDICATORS FOR SUSTAINABLE ENERGY, BY ENERGY EFFICIENCY INDICATOR KEY

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#### LOW SCORE (33-0)

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ASIA PACIFIC China Australia India Indonesia Japan Thailand INDICATOR National energy efficiency planning 92 83 67 75 67 92 Energy efficiency 86 86 86 71 100 100 Information provided to consumers about 42 63 63 electricity usage Energy efficiency incentives from electricity rate 78 78 44 81 81 63 96 structures Mandates and incentives: large 89 89 89 89 100 67 94 consumers Mandates and incentives: public 50 25 0 100 38 100 Ω Mandates and incentives: utilities 17 50 67 0 17 50 63 Financing mechanisms for energy efficiency 100 92 17 92 83 92 Minimum energy performance standards 58 67 11 83 100 33 Energy labeling systems 67 83 75 25 83 83 58 Building energy codes 93 40 0 0 67 80 50 Carbon pricing and monitoring 0 0 0 54 84 83 50 Overall RISE energy efficiency 72 68 34 60 68 83 63

Note: Regulatory Indicators for Sustainable Energy (RISE) is a suite of indicators that assesses the legal and regulatory environment for investment in sustainable energy.

Source: Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017.



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Source: Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017.

# **DOING BUSINESS**



Which countries have an enabling environment for investment in energy efficiency?

### **QUICK FACTS**

- Some of the most energy intensive economies, including Canada, China, the Russian Federation, South Africa or the United States, are now harnessing energy efficiency measures with enabling regulatory environments and favorable business environments.
- Doing Business rankings suggest that Europe and Central Asia have consistently been the regions with the highest average number of reforms per economy; the region is now close to having the same good practices in place as the OECD highincome economies.
- Despite significant progress realized for business development in Indonesia in recent years, notably due to the introduction of regulatory initiatives to improve overall power reliability, the regulatory environment still lacks energy efficiency standards, building codes or mandates for the public sector and utilities.

#### CONTEXT

- Regulatory Indicators for Sustainable Energy (RISE) offers
  policy makers and investors detailed country-level insights on
  the policy and regulatory environment for sustainable energy
  across 111 countries globally while Doing Business measures
  aspects of regulation that enable or prevent private sector
  businesses from starting, operating and expanding.
- Dedicated entities are the necessary building blocks for governments to develop and implement energy efficiency measures, and encourage the private sector engagement. Minimum energy performance standards, appliance labels and building codes are prime candidates for near-term action. Other policy elements are also important but remain often neglected: sectoral-targeted policies for large consumers, the public sector and utilities as well as the development of financing mechanisms.
- The top twenty high-impact countries for energy efficiency show a strong correlation between a high overall RISE Energy Efficiency score and a high ranking on the Ease of Doing Business. Nigeria received its lowest RISE score in Energy Efficiency at 11, with low scores in 11 out of 12 efficiency indicators. Nigeria was ranked 169 out of 190 countries in Doing Business, making improvements in 2015/16 in starting a business and getting credit.

### ADDITIONAL RESOURCES

**Global Tracking Framework 2017** 

Regulatory Indicators for Sustainable Energy 2017

**Doing Business 2017** 

Copenhagen Centre on Energy Efficiency

**SEforALL Africa Hub** 

SEforALL Asia-Pacific Hub

SEforALL Latin America and the Caribbean Hub

**Appliances and Equipment Accelerator** 

**Building Efficiency Accelerator** 

**District Energy Accelerator** 

**Lighting Accelerator** 

**Transport and Motor Vehicle Fuel Efficiency Accelerator** 

**Industrial Energy Efficiency Accelerator** 

**International Energy Agency** 

**Energy Efficiency Facilitating Hub (ECCJ)** 



Which high-impact countries have an enabling environment for investment in energy efficiency?

# REGULATORY INDICATORS FOR SUSTAINABLE ENERGY (RISE) AND DOING BUSINESS RANKING

Population, 2014 values (relative to countries shown)

#### RISE ENERGY EFFICIENCY



Notes: 1. Regulatory Indicators for Sustainable Energy (RISE) is a suite of indicators that assesses the legal and regulatory environment for investment in sustainable energy. 2. Doing Business is a relative ranking of 190 economies based on the regulatory environment. It does this by sorting the aggregate scores of 11 topics, each consisting of several indicators, giving equal weight to each topic. Sources: Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017. "Doing Business 2017: Equal Opportunity for All", http://www.doingbusiness.org/rankings, 2017. Data extracted from http://rise.esmap.org/ on 06/23/2017. World Development Indicators, World Bank Group, 2014. Data extracted from http://data.worldbank.org/indicator/SP.POP.TOTL?end=2014&name\_desc=false&view=chart on 06/20/2017.

# **ENABLING POLICIES**



Which high-impact countries have an enabling environment for investment in energy efficiency and renewable energy?

### QUICK FACTS

- More than three-quarters of all countries covered by Regulatory Indicators for Sustainable Energy (RISE) score well on the legal framework for renewable energy, compared to 9 percent that score well on having energy efficiency mandates and incentives for utilities in place.
- High performers on RISE's energy efficiency indicator often have strong regulations in place to support renewable energy deployment. However, the average RISE score for energy efficiency is more than ten percentage points below that for renewable energy.
- Official renewable energy targets have become nearly universal, with some form of public commitment in 93 percent of countries covered by the RISE indicators.
- Most of the world's largest energy consumers score in the top tier of the RISE renewable energy indicator indicating strong policy frameworks are in place.

### CONTEXT

- RISE offers policy makers and investors detailed countrylevel insights on the policy and regulatory environment for sustainable energy across 111 countries globally.
- RISE shines a light on the need to attach greater political and policy priority to energy efficiency. With the exception of the highest income countries, many countries have few or no policies in place to support the adoption of ambitious energy efficiency measures. In contrast, RISE highlights strong progress and broad uptake in advancing renewables policy across many countries.
- Among the countries where wind and solar power account for at least 5 percent of total electricity generated in 2014, more than 80 percent have completed a grid integration study to understand how to integrate variable renewable energy.
- India and China together represent more than a third of the global population. Driven in part by clean air imperatives and low-carbon development ambitions they both have high scores on RISE for renewable energy and energy efficiency. China's 13th Five-Year Plan sets a 15 percent target of nonfossil energy as a share of total final energy consumption by 2020, and a 15 percent reduction in energy intensity compared to 2015 levels. India has placed energy conservation at the heart of its development strategy through multiple initiatives such as "Unnat Jeevan By Affordable LEDs and Appliances for All", the world's largest zero-subsidy LED bulb program for domestic consumers.

### ADDITIONAL RESOURCES

Regulatory Indicators for Sustainable Energy 2017

**Global Tracking Framework 2017** 

**State of Electricity Access Report** 

**SEforALL Africa Hub** 

SEforALL Asia-Pacific Hub

SEforALL Latin America and the Caribbean Hub

**International Renewable Energy Agency** 

Copenhagen Centre on Energy Efficiency

**Appliances and Equipment Accelerator** 

**Building Efficiency Accelerator** 

**District Energy Accelerator** 

**Lighting Accelerator** 

**Transport and Motor Vehicle Fuel Efficiency Accelerator** 

**Industrial Energy Efficiency Accelerator** 

**International Energy Agency** 

**Energy Efficiency Facilitating Hub (ECCJ)** 

# **RISE**

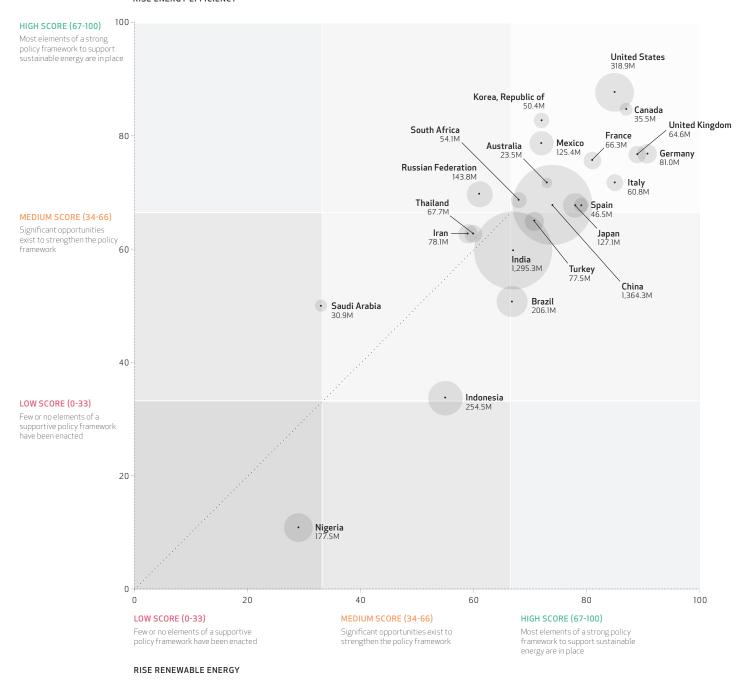


Which high-impact countries have an enabling environment for investment in energy efficiency and renewable energy?

# REGULATORY INDICATORS FOR SUSTAINABLE ENERGY (RISE) FOR ENERGY EFFICIENCY AND RENEWABLE ENERGY

Population, 2014
values (relative to countries shown)

#### RISE ENERGY EFFICIENCY



Note: Regulatory Indicators for Sustainable Energy (RISE) is a suite of indicators that assesses the legal and regulatory environment for investment in sustainable energy.

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Which countries have an enabling environment for investment in energy efficiency?

### **QUICK FACTS**

- The top 20 energy consuming economies globally –highimpact countries – accounted for more than 75 percent of global total primary energy supply (TPES). Four countries alone, China, the United States, India and the Russian Federation, accounted for nearly 50 percent of TPES.
- Energy savings realized globally between 2012–14 were equivalent to the entire energy consumption of Brazil and Pakistan combined in 2014.
- Brazil, Iran, Saudi Arabia, South Africa, and Thailand saw their energy intensities increase over 2012-14.
- Industry has contributed much to declining global energy intensity, with an annual reduction of 2.2 percent in 2012–14 while the residential sector saw a small increase in energy intensity.

### CONTEXT

- Energy efficiency offers a huge opportunity to embark on a sustainable development path and for the industrialized world and fast growing economies this should be top of the to do list. Reducing energy intensity, which measures the amount of energy needed to produce a dollar of gross domestic product (GDP), is smart growth even for the least developed economies.
- Since 1990, primary energy intensities have been decreasing worldwide to converge towards 5.5 megajoules per dollar of GDP. Some high-income European countries, Denmark, Italy and the United Kingdom, have already gone as low as 3.4 megajoules per dollar of GDP, which corresponds to the 2030 global target for energy efficiency.
- The intensity of final energy consumption in industry, agriculture, services, and transport sectors are on a longterm downward trend. Improvements in the efficiency of thermal power generation and power networks losses have been relatively slow. Widespread diffusion of fuel efficiency standards helped accelerate reductions in energy intensity of the transport sector. The residential sector is a large and fast growing segment of energy consumption and is becoming more energy intensive.
- To reach the 2030 objective for energy efficiency, we must focus on the sectors with significant room for improvement, starting with the transport sector which concentrates twothirds of global oil consumption. The switch from coal to gas in industrial processes, together with the electrification of energy use and the adoption of super-efficient appliances in the buildings sector also offer sizeable potential for energy savings.

## ADDITIONAL RESOURCES

**Global Tracking Framework 2017** 

Regulatory Indicators for Sustainable Energy 2017

**Doing Business 2017** 

Copenhagen Centre on Energy Efficiency

SEforALL Africa Hub

SEforALL Asia-Pacific Hub

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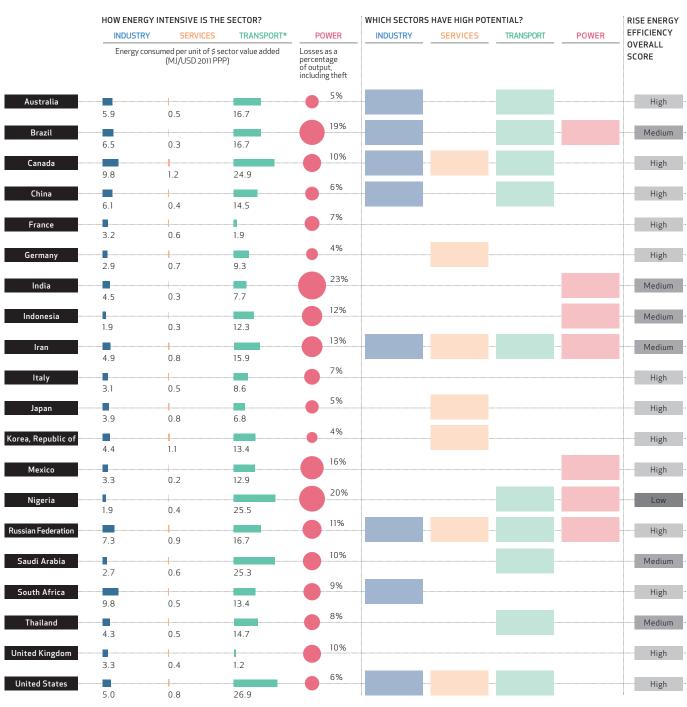
**International Energy Agency** 

**Energy Efficiency Facilitating Hub (ECCJ)** 



Which sectors have the largest potential for energy efficiency improvement?





<sup>\* 2012</sup> data

Note: A sector is considered high potential in a country if the energy intensity is at or above the average of the 20 high impact countries.

Sources: International Energy Agency (IEA) and the World Bank. 2017. "Progress Towards Sustainable Energy: Global Tracking Framework 2017" (April), World Bank, Washington, DC. Regulatory Indicators for Sustainable Energy (RISE), World Bank Group, 2017.