Accelerating the Global Adoption of

ENERGY-EFFICIENT AND CLIMATE-FRIENDLY REFRIGERATORS

POLICY GUIDE SERIES

10 per cent of **residential electricity** is used to power refrigerators

The stock of refrigerators in **150** developing and emerging **economies** is expected to **double** from around **1 billion**, today, to nearly **2 billion** by 2030

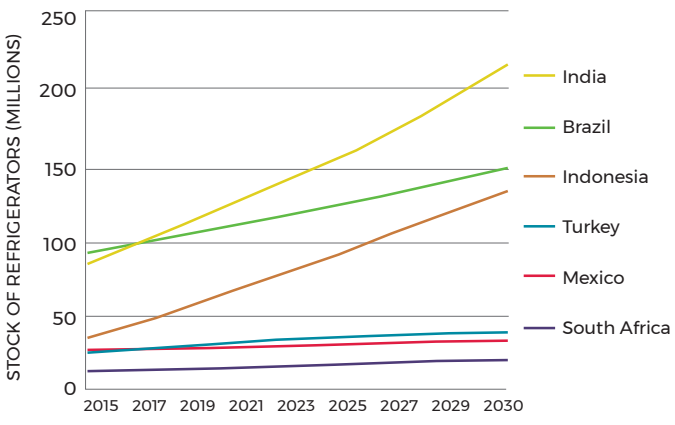
These countries can reduce refrigerator electricity demand by **60 per cent** and mitigate **90 million tonnes** of **CO_2 emissions** each year starting in 2030

United for Efficiency helps developing and emerging economies transform their markets for refrigerators using a proven **Integrated Policy Approach**

BACKGROUND

Refrigerators are a convenient and safe means to preserve food and medicine. A refrigerator is one of the first appliances to be bought once an electricity connection is available to a household.

About 10 per cent of residential electricity is used to power refrigerators. Expanding economies and growing populations are driving increased demand.



The total number of refrigerators is growing rapidly*

**Source: United for Efficiency Country Assessments 2015*

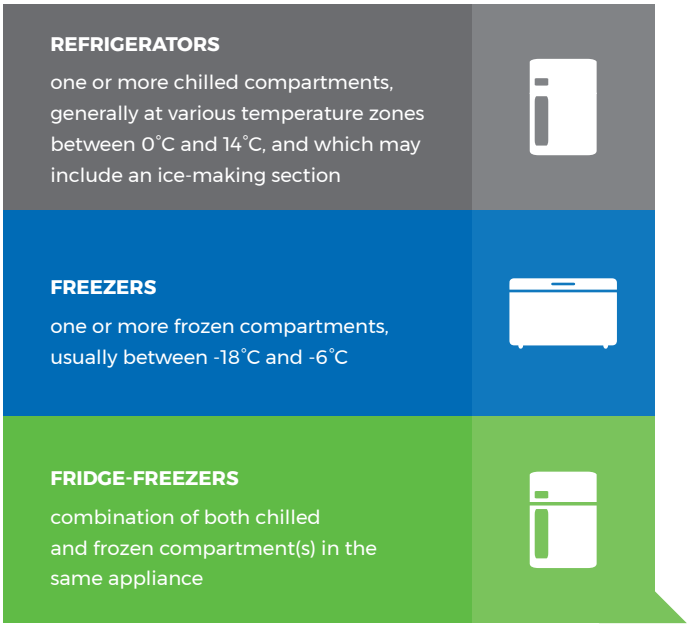
U4E United for Efficiency

While most developed countries have regulations to mitigate the energy and climate impacts of these products, many developing and emerging economies do not. Those with regulations should conduct regular reviews and enhance the requirements to keep pace with available improvements in these products. Unfortunately, outdated technologies are common and a lot of electricity is wasted around the world.

Refrigerants released during maintenance, leaking over the course of normal operation, or vented at the end of the product life can be harmful if not handled and processed appropriately. Depending on the type, refrigerants can damage the ozone layer, contribute to climate change, are flammable, and/or are toxic.

The overall climate impact of a refrigerator varies significantly depending on the performance of the equipment (e.g. how much electricity it uses, and the indirect emissions from generating and delivering that electricity) and the type of refrigerant (e.g. the global warming potential, GWP of the refrigerant and the direct emissions when that refrigerant leaks or is vented).

Household refrigerators powered by grid-connected electricity are the target of policies recommended in this guide.



Scope of Appliances covered by this Guide

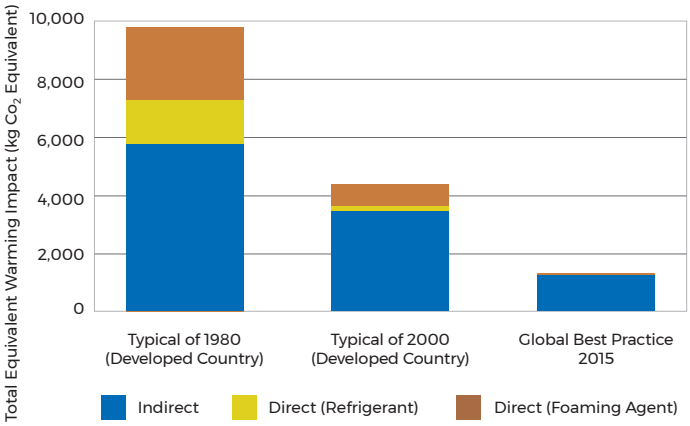
WHY LEAPFROG TO ENERGY-EFFICIENT AND CLIMATE-FRIENDLY REFRIGERATORS?

The stock of refrigerators in 150 developing and emerging economies is expected to double from around 1 billion, today, to nearly 2 billion by 2030.

Now is the time to ensure that energy-efficient and climate-friendly products meet growing demand for refrigerators.

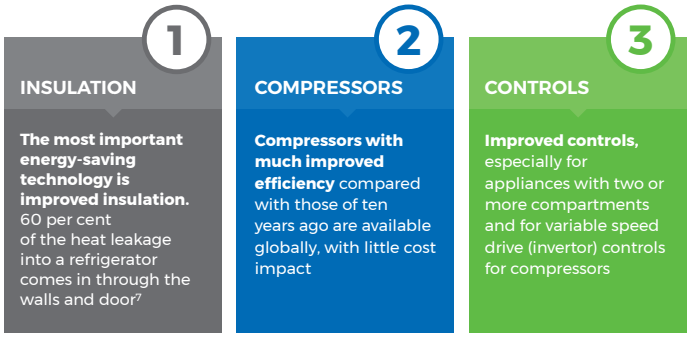
Getting this transition right unlocks multiple benefits for governments, businesses and consumers. The Refrigerators Policy Guide includes plenty of useful examples from around the world of lower electricity bills for residents and businesses, reduced peak loading at power plants and related pollution, less harmful refrigerants released in the air, and less material sent to landfills.

These benefits can only be realised through a widespread and lasting shift to energy-efficient and climate-friendly technologies.



Mitigating direct and indirect emissions through better performance, and refrigerants and foaming agents with lower global warming potential (GWP).

Fortunately, there are proven ways to accelerate the adoption of such products and to eliminate outdated technologies from the market. Well-designed and implemented policies can enable developing and emerging economies to reduce refrigerator electricity demand by 60 per cent and mitigate 90 million tonnes of CO_2 emissions each year starting in 2030. Moreover, a number of technologies are readily available to enhance the performance of refrigerators.

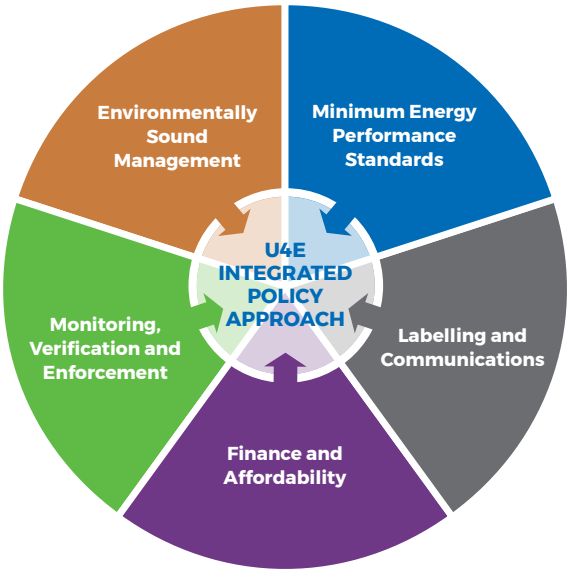


Some of the leading technology solutions to enhance performance.

Energy-efficient and climate-friendly refrigerators typically have a higher up-front price, but this investment is returned over time in the form of lower electricity bills. The total cost of ownership over the lifetime of the refrigerator can be much lower for an efficient unit. The payback time varies depending on the purchase price and the cost of electricity.

RECOMMENDATIONS TO POLICYMAKERS

Policymakers are encouraged to follow United for Efficiency's *Integrated Policy Approach* to transform their markets. A National Efficient Refrigerators Strategy should be developed to show how such a transformation is to unfold in the years ahead.



The strategy development process brings key stakeholders together to foster a shared vision for the market and to identify the resources and mechanisms needed to pursue it. Policymakers should collaborate with others in the region to harmonise standards according to international best practices, and to share resources and lessons learned.

An Integrated Policy Approach includes:

Standards are essential to market transformation. Mandatory minimum energy performance standards should be adopted so that energy-wasting products are banned from the market. Testing methods and definitions should reference international best practices. Technical, economic and market analysis should be conducted to inform the standards-setting process. Ensure the refrigerant and foam-blowing agent have zero ozone depletion potential and GWP that is as low as practicable (preferably a GWP of 20 or less).

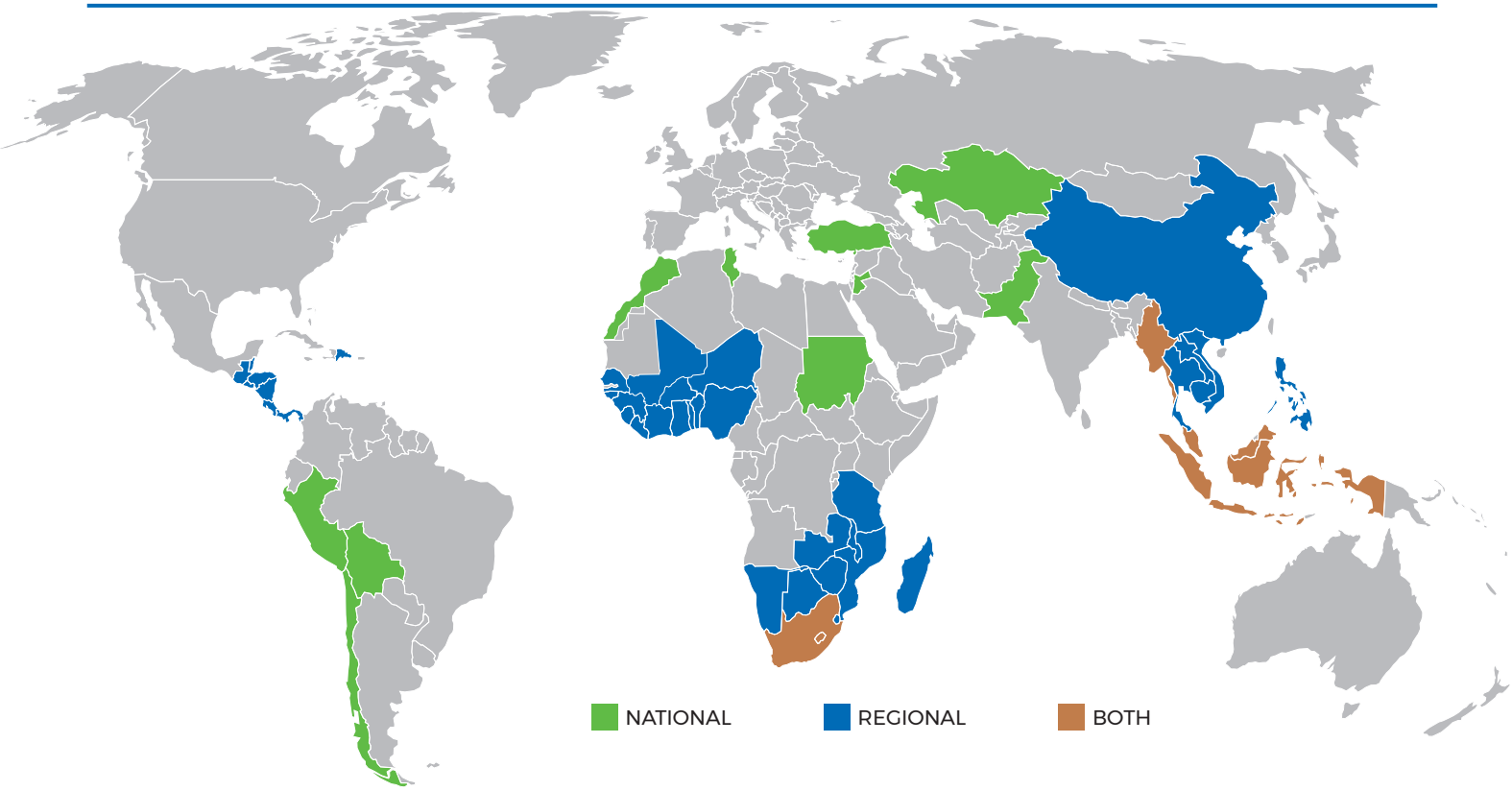
Labelling and communication support standards by ensuring that information about efficient products is clearly and consistently conveyed. Labels may include an endorsement of performance, a comparison to others product and/or additional information to help purchasers make informed decisions. Countries should consider using a well-recognised existing label to minimise trade barriers and compliance costs for manufacturers. Awareness campaigns should help people and businesses understand their role in market transformation, such as how to apply labelling information in their purchasing decisions and how changes in their habits impact electricity use.

Monitoring, verification and enforcement (MVE) ensures the integrity of market-transformation. Programme administrators must oversee products sold in the market, help verify compliance with standards and labels (e.g. through product testing), enforce these requirements, and report the results so that consumers and businesses trust and benefit from refrigerators that meet their energy and quality claims. IEC 62552 should be used as the test method for evaluating refrigerator performance.

Financial mechanisms help address the barriers to investment in energy-efficient and climate-friendly products, such as higher purchase prices and uncertainty of the life-cycle cost savings. Public procurement officials, consumers and businesses should consider a variety of approaches - existing budgets, bulk procurements, grants, rebates, loans, leases, utility bill financing schemes, credit guarantees and so on.

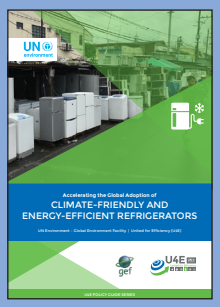
Environmentally Sound Management and Health considerations are crucial to ensure products do not cause undue harm to people or the planet during manufacturing, operation, or recycling and disposal. Ensure compliance with safety requirements, such as ISO 5149. Consider the implications of the phase-out of some existing refrigerants under the Montreal Protocol and the emergence of new refrigerants when assessing requirements for mandatory and voluntary policies and programmes. Collect and process the steel, copper, aluminium, plastics and the refrigerant at the end of the product life.

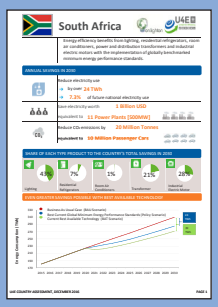
CURRENT UNITED FOR EFFICIENCY NATIONAL PROJECTS AND REGIONAL HARMONISATION ACTIVITIES



ABOUT UNITED FOR EFFICIENCY

United for Efficiency is a global initiative led by UN Environment, funded by the Global Environment Facility, and supported by leading companies, expert organisations and public entities with a shared interest in transforming markets for lighting, appliances and equipment.





Download the full policy guide and review the 150 United for Efficiency Country Savings Assessments at our website.

UN environment

UNDP

gef

LEARN MORE

www.united4efficiency.org | u4e@un.org