VEF VIRTUAL SERIES

ACCELERATING ENERGY TRANSITION

UN environment programme

U4E United for Efficiency

SUSTAINABLE ENERGY FOR ALL

gef

Austrian Development Agency

Federal Ministry Republic of Austria European and International Affairs

IIASA International Institute for Applied Systems Analysis

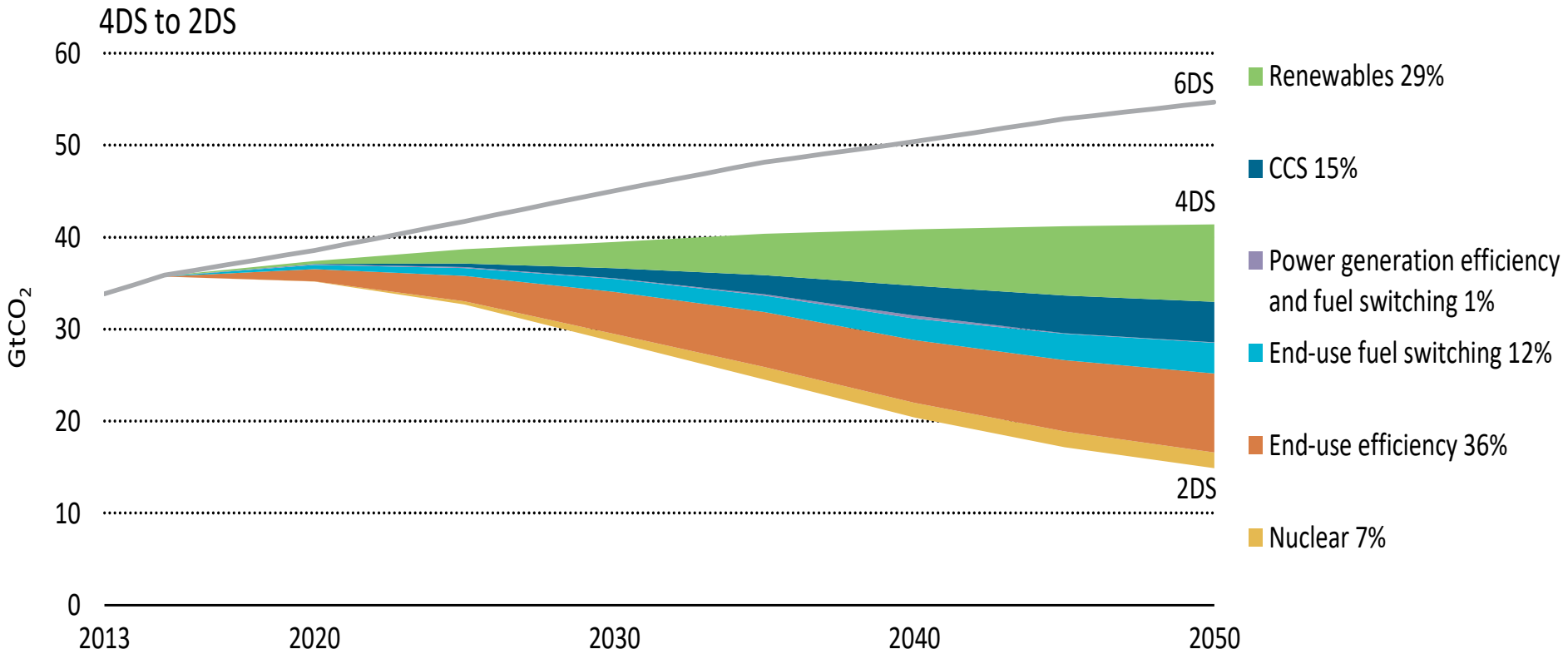
UNIDO

Energy Efficiency Policies and Regulations

What are the Most Effective Energy Efficiency Policies to Accelerate the Energy Transition?

17 February 2021

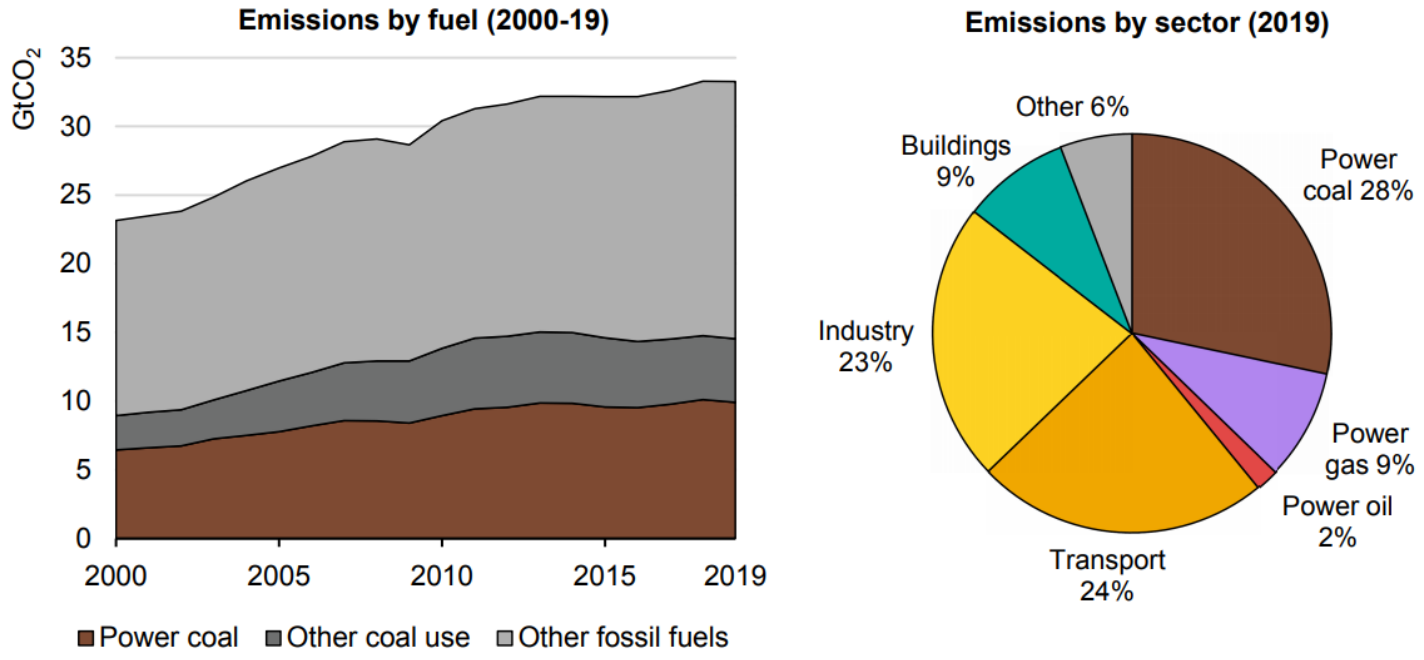
The Largest GHG Reductions to get to 2 Degrees need to come from *End Use Energy Efficiency*



Source: IEA *Energy Technology Perspectives 2016*

Electricity is the largest GHG emissions sector

Figure 1.9 Global energy-related CO_2 emissions by fuel (left) and sector (right), 2000-19



Power generation, where coal use is increasingly concentrated, is the biggest emitter of CO_2 worldwide, accounting for about 40% of total emissions.

Source: IEA *Energy Technology Perspectives 2020*

Fast Increasing Global Electrification

The world is going digital, urban, and electric

Data and digitalization[1]

7.5x

Increase in data processed outside of originating core

Urbanization[2]

+2 billion

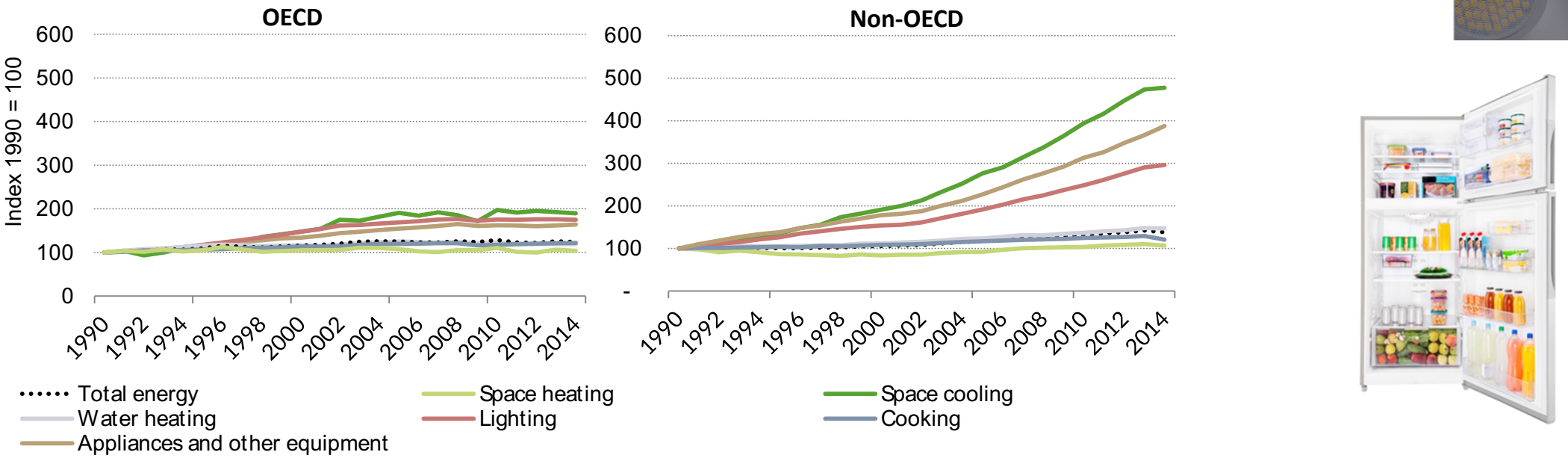
people living in cities

Shift to electricity[3]

+35%

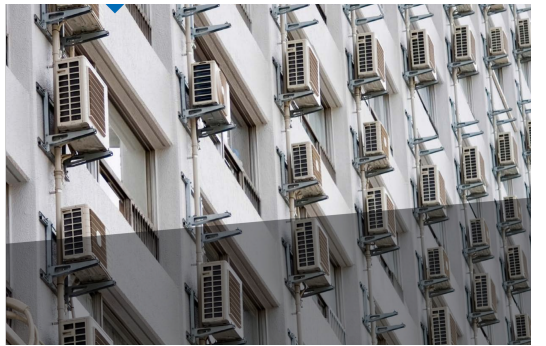
Share of electricity in the energy consumption mix

Non-OECD Countries have Rapid Cooling and Appliance Growth



Source: IEA *Energy Technology Perspectives 2017*

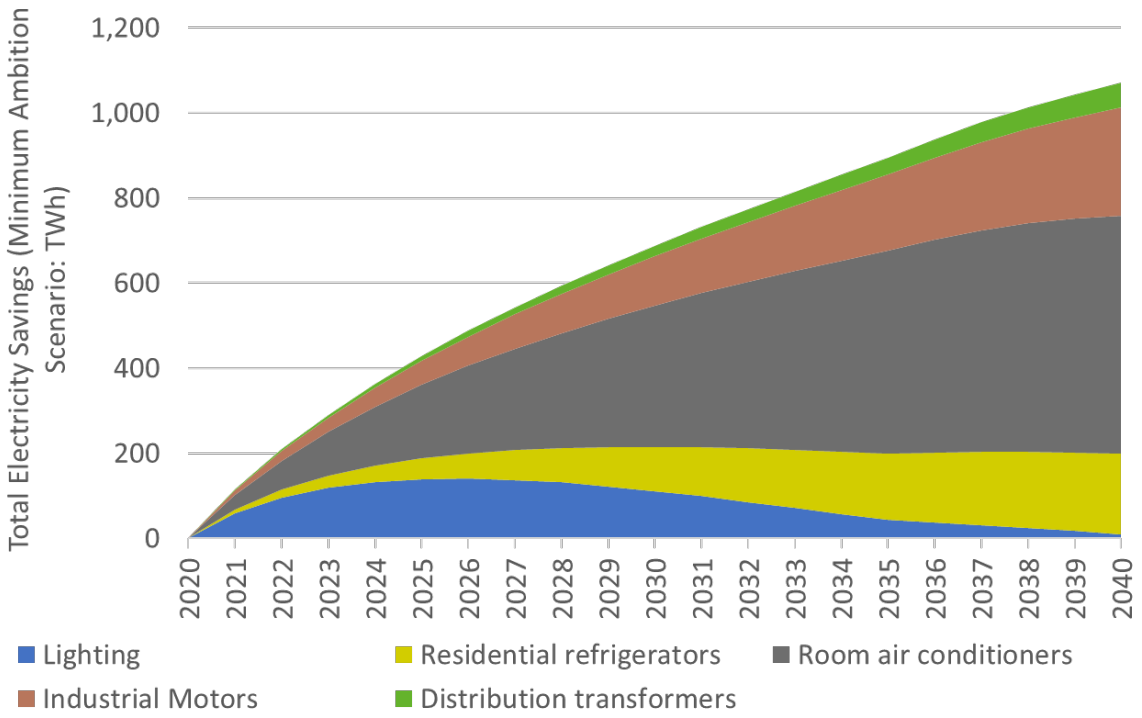
10 New A/Cs Sold Every Second



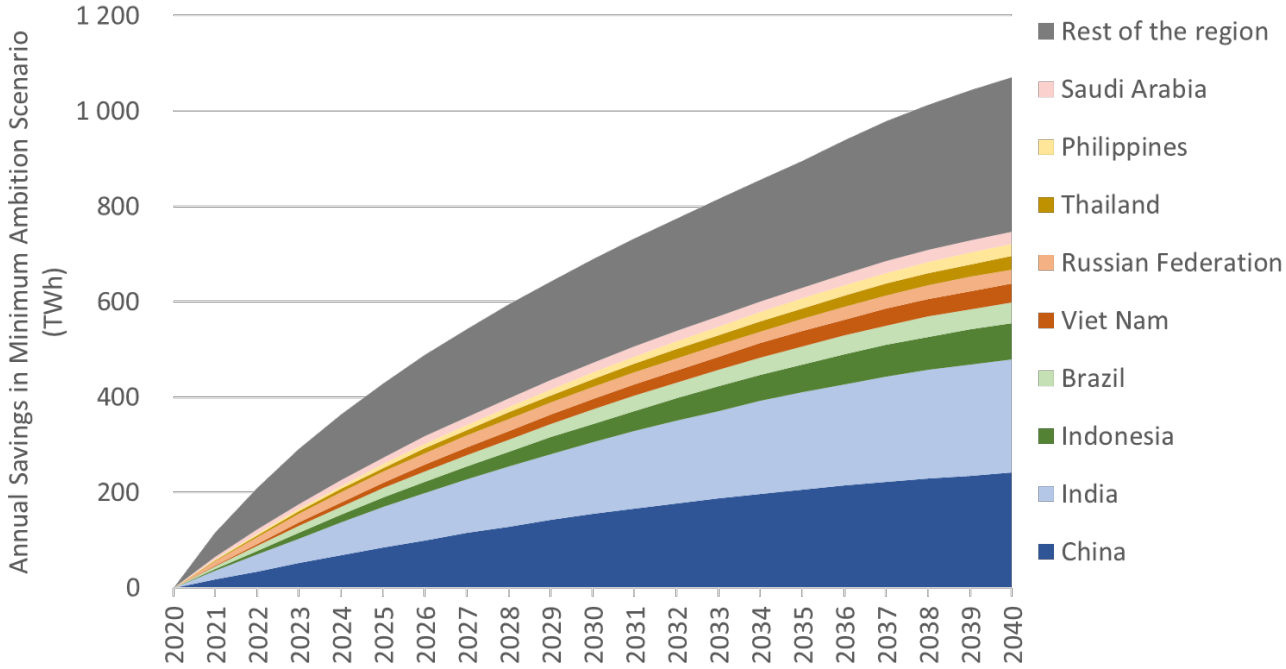
Large Savings Opportunity from Energy-Efficient Lighting, Appliances and Equipment

Significant Savings from Energy Efficient Products by 2040*

Savings by Product



Savings by Country

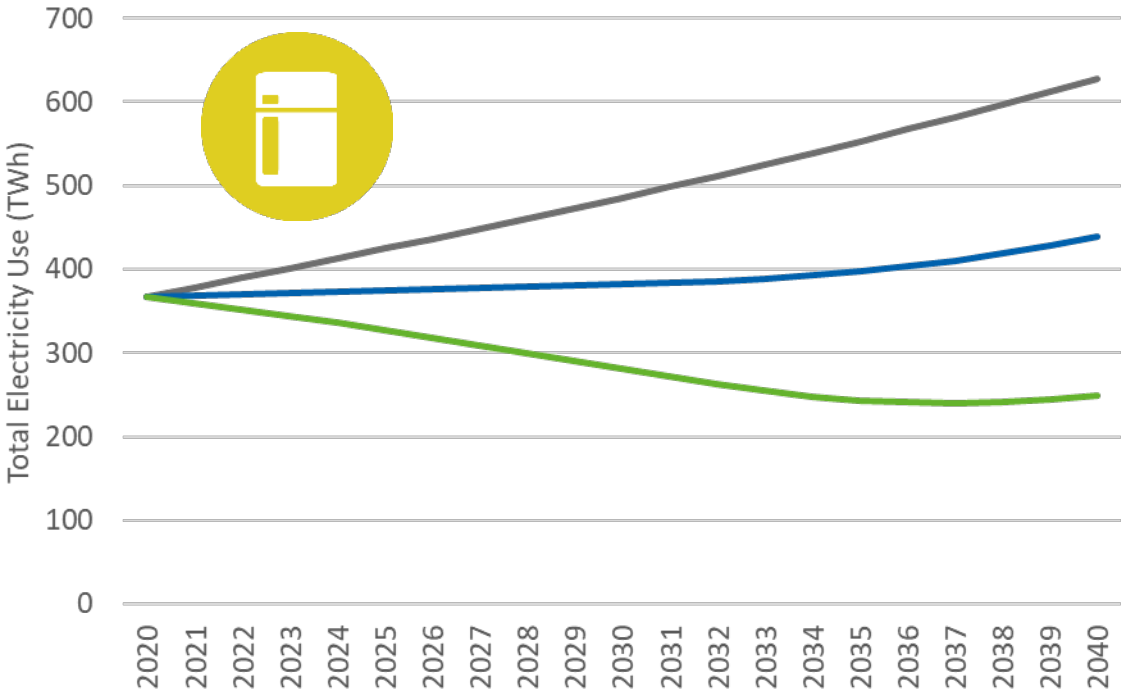


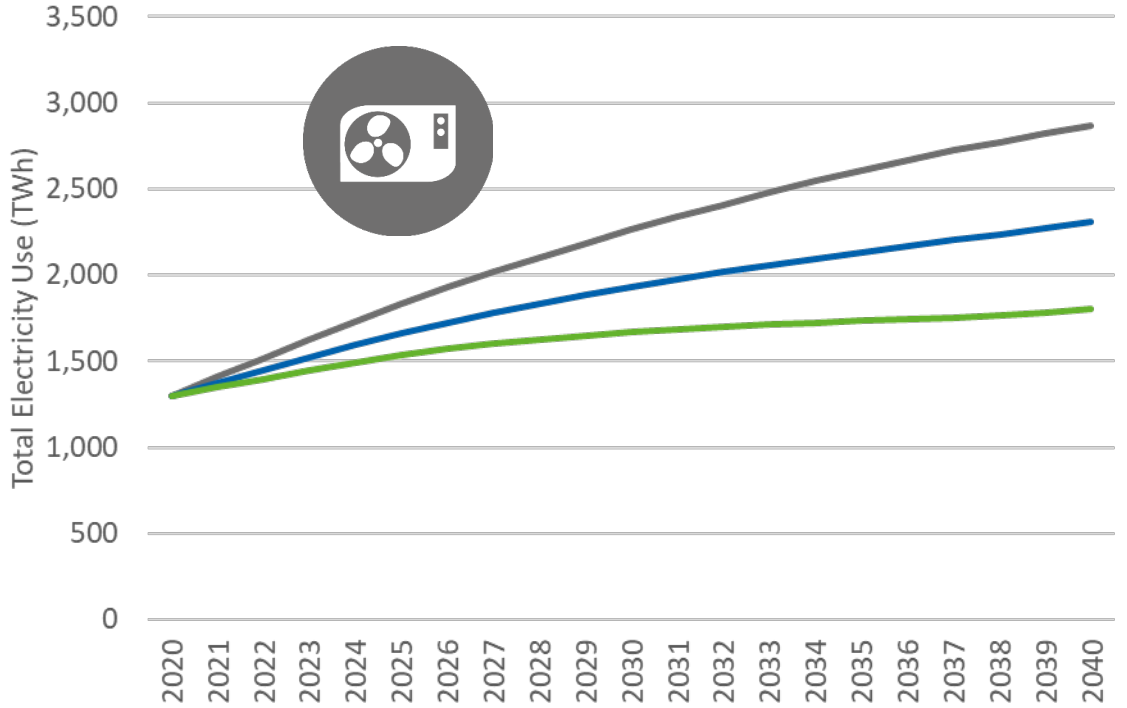
For individual Country Saving Assessments see:
https://united4efficiency.org/countries/country-assessments/

* Graph refers to the 156 developing countries and emerging economies that had been assessed for the U4E Country Saving Assessments.

10-20% Global GHG Saving with Efficient Cooling Appliances

Very Large Savings Potential for High Performance Room ACs and Refrigerators by 2040*





749 TWh of electricity consumption, which is equivalent to:

- **342 Power stations** [500 MW each]
- **639** Million tonnes of **CO2**
- **68** Billion **USD on electricity bills**

* Graph refers to the 156 developing countries and emerging economies that had been assessed for the U4E Country Saving Assessments.

** Residential Refrigerators Only – Commercial Refrigerator Savings are approx. the same again.

*** Minimum Ambition Scenario.

U4E United for Efficiency

Supporting Countries to Save 20% of their Electricity

By accelerating the Global Transition to **much more energy efficient lighting and appliance technologies** by strengthening country capacities around the world, as well as ensuring environmentally sound management practices. Building synergies among stakeholders, sharing knowledge and information, helping create strategic policy and regulatory frameworks, and addressing technical and quality issues.

United for Efficiency (united4efficiency.org)

Electric Motors

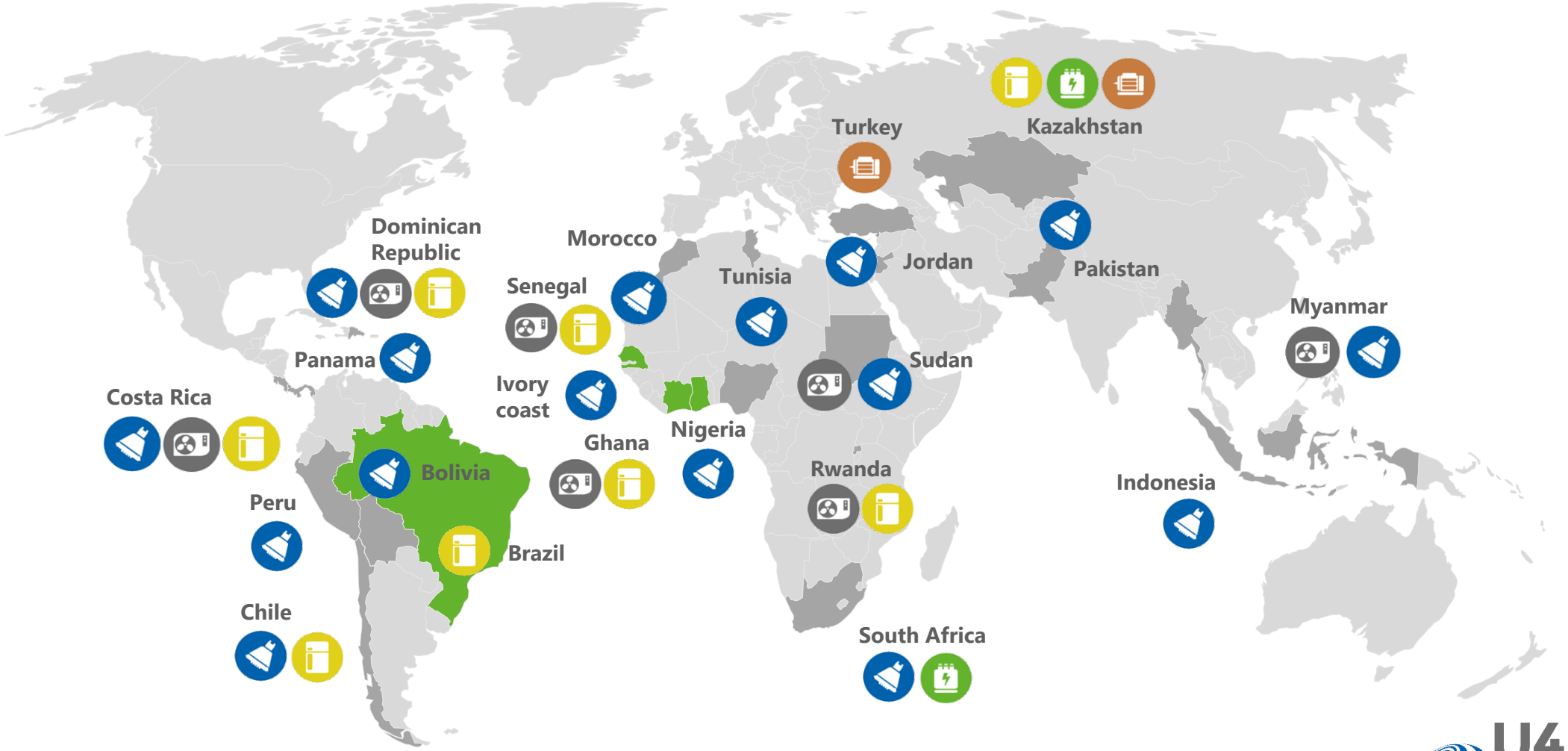
Light Bulbs

Residential Refrigerators

Room Air Conditioners

Distribution Transformers

United for Efficiency Country Level Projects



What are the Most Effective Energy Efficiency Policies to Accelerate the Energy Transition and how can they be Implemented Effectively?

Barriers

Primary & Secondary Barrier Examples:

- Lack of Capacity, Knowledge, National Priority/Frameworks; [*Technical, Regulatory, Institutional*]
- No or Low Level Implementation Programmes & Funding;
- No Integrated Strategic Approach to Energy Supply & Demand;
- Existing Market Structures [*Distorting Subsidies, Limited Affordable Higher Performance Product Availability*]
- Lack of Effective Market Monitoring & Verification Framework [*Testing Facilities*]
- Lack of Financial Mechanisms to help Drive the Market [*Bulk & Public Procurement*]
- No Environmentally Sound Management

Opportunities

- Scaling of Proven Effective Transformation Polices and Regulations with International & Regional Harmonised Supports; [*Large Savings and Local Employment Opportunities*]
- Resourcing Focused Integrated, Sustained, Market Facing Programmes at Global, Regional and National & City Levels; *[Fast, Low Cost]*
- Applying Integrated Energy Supply and Energy Demand Approaches to Sustainable Energy Implementation – RE+EE Together
- Green Financing and Green Procurement Only Practices by Governments and Private Sector, Including Financial and Funding Institutions
- Integrate Environmentally Sound Management – [*Ban Used Product Imports*]
- Link Multiple Additional/Spin-off Benefits

What are the Multiple/Additional/Spin-Off Benefits? Can they be 'Fast' Primary Drivers in Moving Markets?

Wide Socio-Economic Benefits

- Avoided Unnecessary Power Plants & Electricity Network Infrastructure Costs
- Avoided Power Blackouts and Brownouts with Digital Controls (A/Cs, LED Lighting, Refrigerators) **= more competitive & reliable national energy supply**
- Greater and more diverse local consumer purchasing power from the $ Billions in redirected consumer savings to the national economy **= more local economic activity**
- **Less operating and maintenance costs for State Utilities & Public Authorities** e.g. LED Street Lighting, Digital Urban Water Management Systems, Digital Power Transformers
- Reduced energy import dependence **= more predicable, affordable electricity prices and greater energy security**
- More modern, affordable appliances lessen socio-economic divides, **improving equality, health and education levels** – e.g. **clean electric cooking, LED lighting, cooling**
- Higher quality product norms support Decent Work, Safety & Environmentally Sound Management Standards (SCP)
- New, local, **sustainable jobs** in green building construction, refurbishment and product replacement programmes [x 3 times as many as from fossil fuels]

Major Food & Water Security & Supply Benefits

- **Reducing food waste by 20% with higher performance refrigeration technologies** – e.g. new refrigerator compartments at 0 degrees can cut fresh food waste from households by 20%. These can double emissions reductions from the cold chain and double the $$ economic savings for consumers at the same time
- **Reducing Water Consumption by 40%** with higher performance motors, pumps and digital water monitoring networks
- **Increasing Agri & Fishery Sector Incomes by up to 40% with more efficient commercial refrigeration** = more & higher value produce to markets

Major Freeing of Electricity for Access

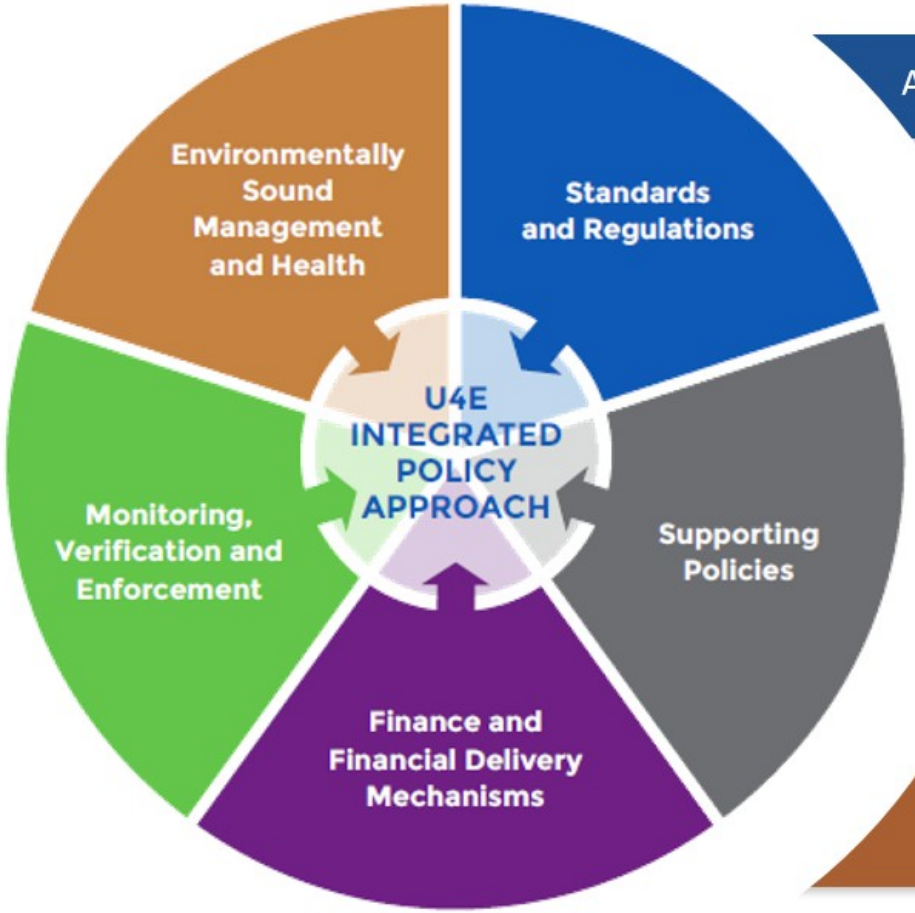
More efficient power networks & products can free-up otherwise wasted electricity to supply 100s of millions of people in need of electricity access and 100's of millions more with unreliable power supply

More Sustainable Local Business Infrastructure

Supporting New Industry and Utility Models e.g. Integrated Communication & Digital Power Networks, Smart Metering, Green Public Transport & E-Cars, Green Data Centres

Strategic 5-Year Integrated Policy Approach Programmes Work

U4E Implements a Proven *Integrated Policy Approach* for Product Market Transformation



Adopt minimum energy performance and internationally-recognized test standards

Ensure effective labels are in place and that appropriate consumer information and advice is available

Consider a blend of financing mechanisms and incentives to help offset the incremental costs of energy-efficient products

Include legal authority, enforcement powers, capacities and penalties in the national legal and enforcement frameworks;
Use a product registration system as an initial compliance gateway

Provide for Materials Recovery (e.g. glass, ferrous and nonferrous metals and phosphors including any mercury in lamps and refrigerant gases).

Standards, Labelling, Green Public Procurement and Market Based Incentives Work

Energy Efficiency of Products in the Market

Incentives/GPP to support the adoption of the best products (e.g. rebates, financing schemes, bulk procurement, SPP)

Promote efficient products (e.g. labels and awareness campaigns to help buyers understand EE benefits)

Minimum Energy Performance Standards (MEPS) ban the worst products

Monitor the market for MEPS compliance, test the products and enforce the rules

+

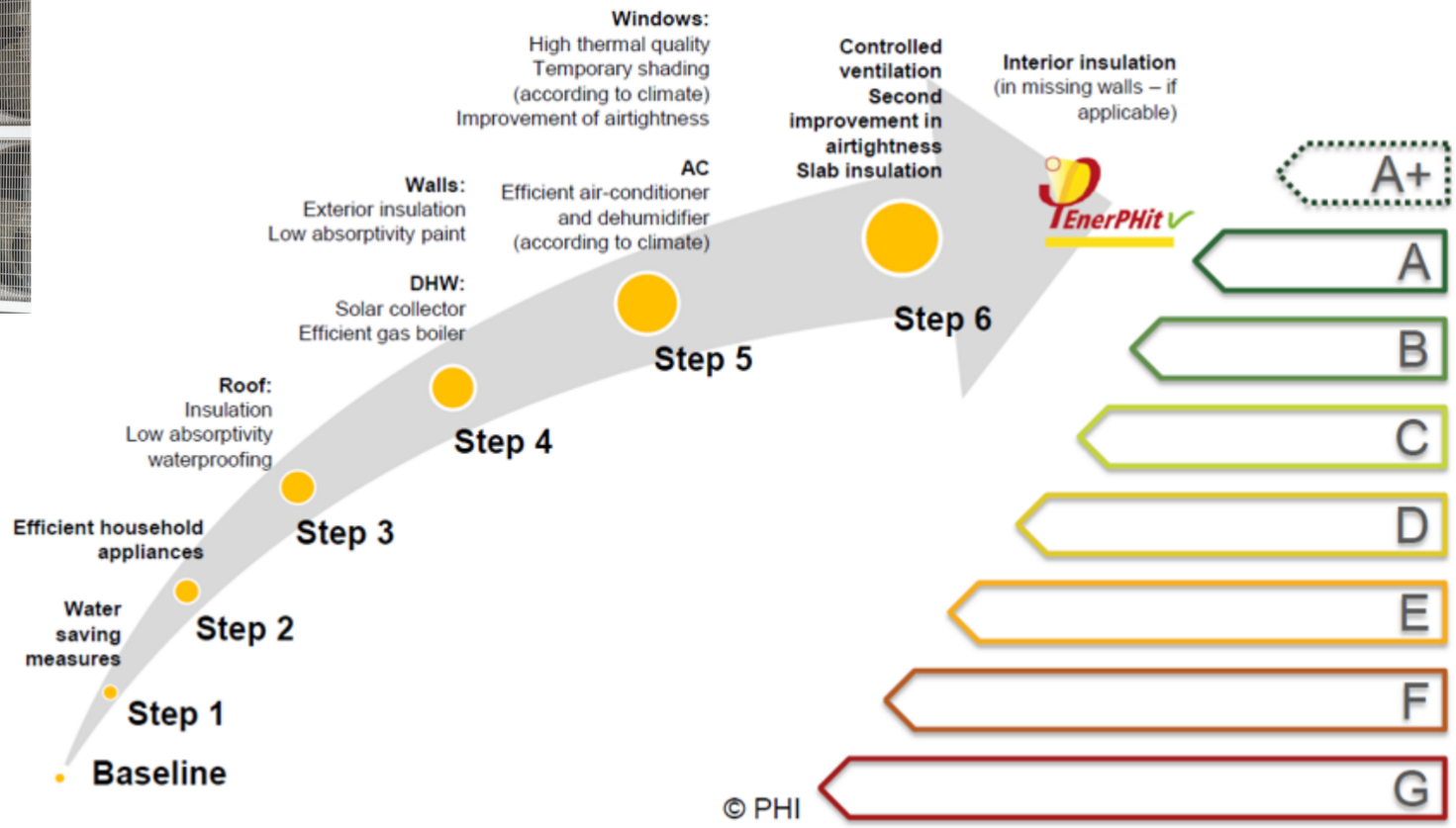
ESM to Recycle & Dispose of old products in a Sustainable way

E.G. Pakistan Energy Efficient Market Transformation

First Mandatory Minimum Energy Performance Standards (MEPS) for Energy Efficient LED Lighting for 230 Million People. $ 1 Billion in Savings.

U4E United for Efficiency

Priority Step-by-Step Approach to Energy Efficient Buildings Works



Concept for the step-by-step implementation of energy efficiency measures in existing housing in Mexico. Source: NAMA Vivienda Existente; Authors: PHI, IzN Friedrichsdorf, GOPA Consultants; Review and supervision: CONAVI,

Green Technology Procurement & Finance Works

Approach

E.G. An Integrated Purchasing Approach for Green Public Procurement

Legislation Framework
- International: NDC, Kigali, ILO, etc.
- National: Public Finances & Procurement

Financing Models & Incentives
- “Regular” Capex Procurement
- Alternative Delivery Models

Sustainability Specifications & Requirements
- Product: Primarily Environmental
- Supplier: Primarily Social & Governance

Include Multiple-Benefit & Stakeholder Factors
- Additional Economic, Energy & Food Security Benefits
- Additional Social & Community Benefits
- Political Buy-In and Priority

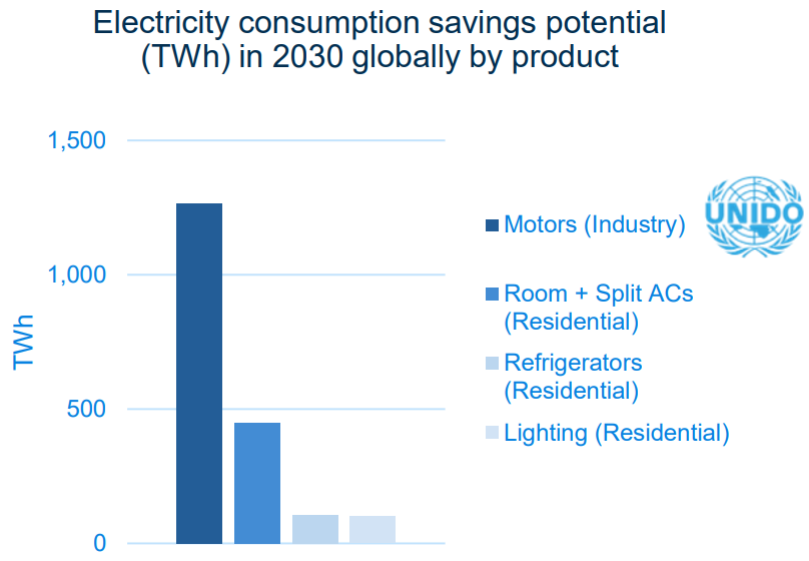
Effective Energy Performance Standards Progressing but Still Missing in Many Economies

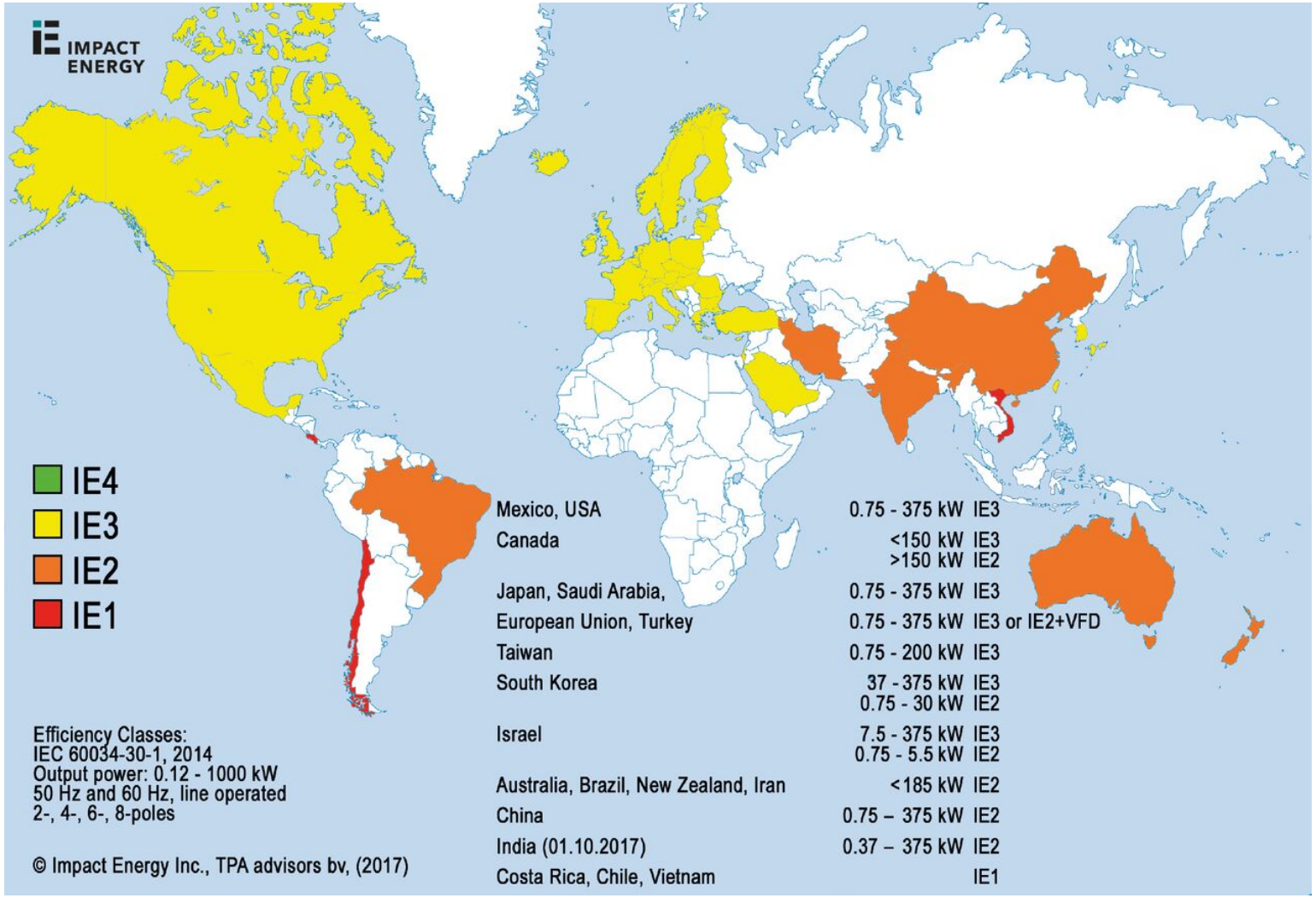
Motors Example

50% of Electricity Use

Majority are Pumps, Fans, Compressors

Major Market Savings Potential





Thank you!

TRANSFORMING MARKETS TO ENERGY-EFFICIENT PRODUCTS

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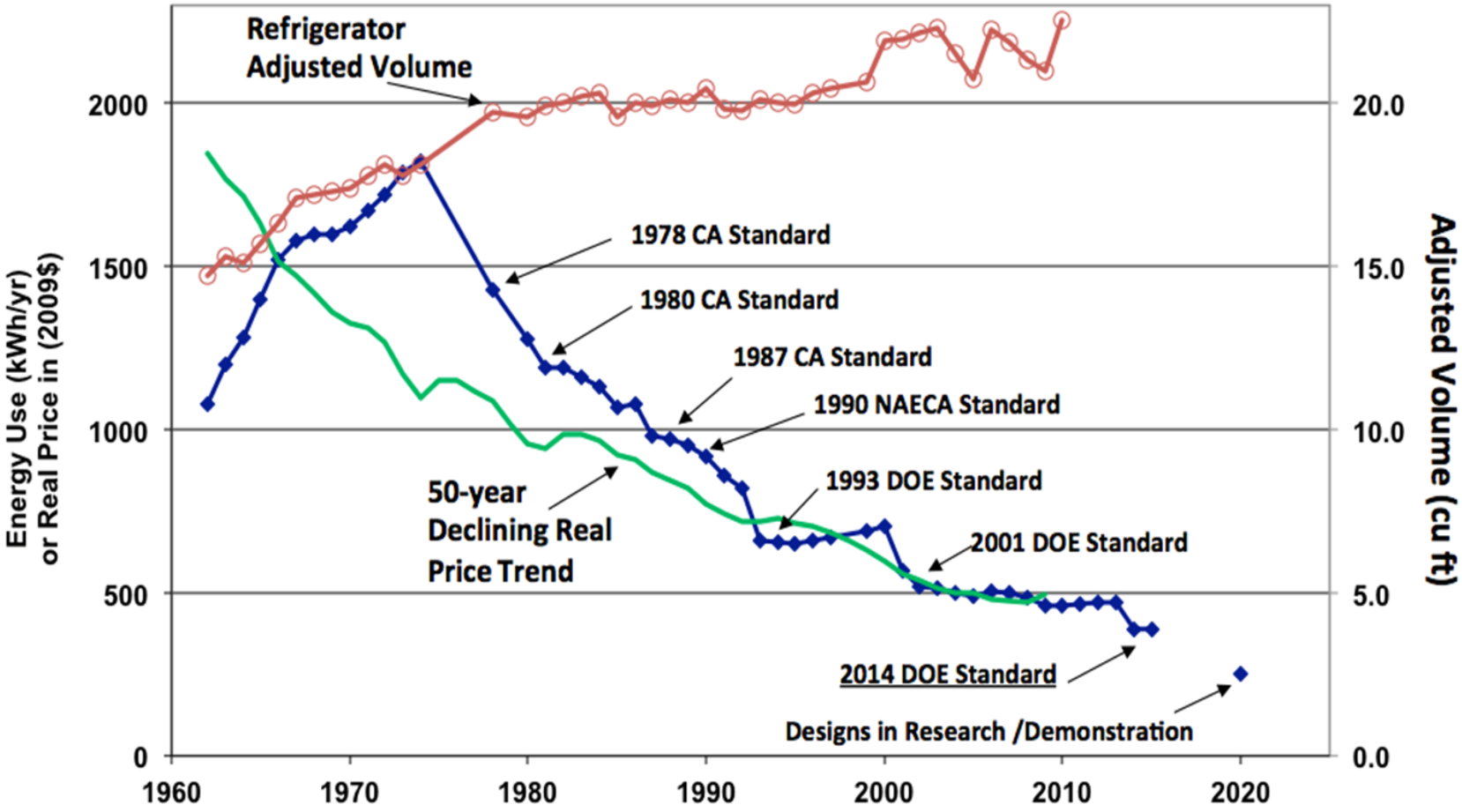
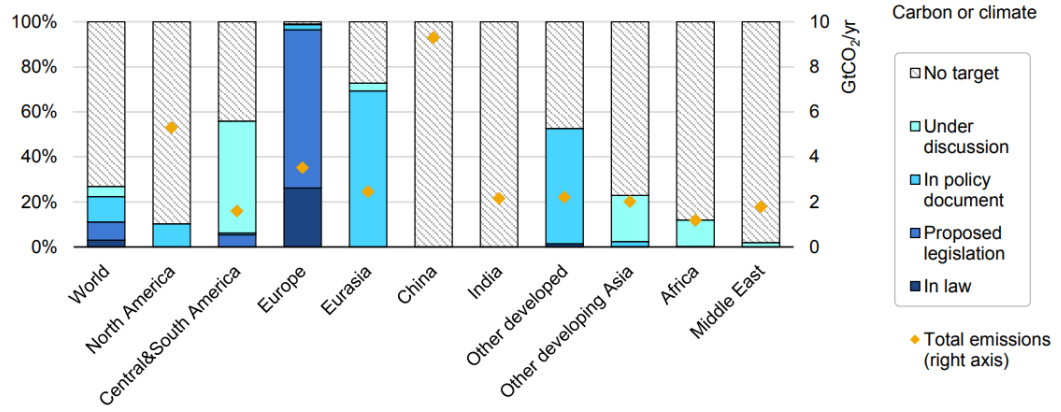
Win-Win Impacts of Efficiency Policies and Affordability



Sources: AHAM, Rosenfeld (1999),
LBNL, and Bureau of Labor Statistics

For Net-Zero 2050 the Policy Commitments are Largely Missing in Many Economies

Figure 7.1 Share of energy-related CO_2 emissions covered by national and supra-national public net-zero emissions targets today

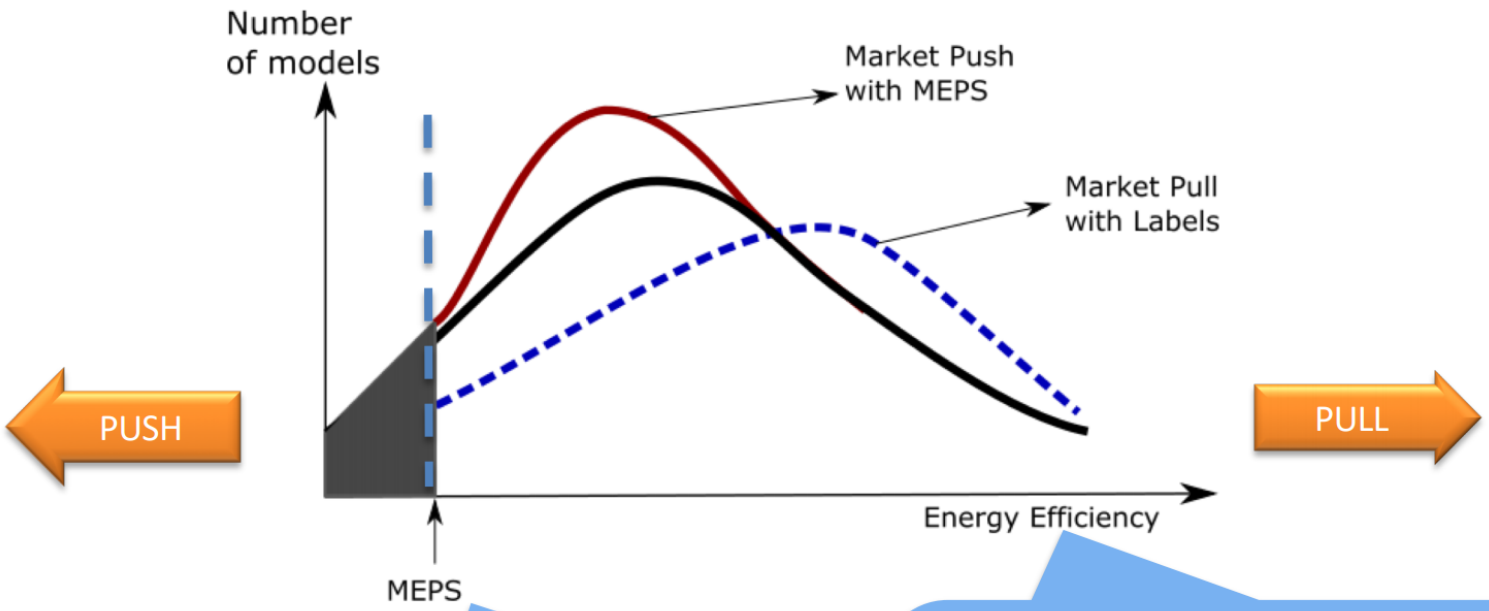


Notes: The emissions coverage by national and supra-national targets excludes sub-national commitments (e.g. commitments from Australian or US states, Chinese provinces, cities). Following the European Union Climate Law, EU member states are classified in the category "proposed legislation" unless the country has a target already in domestic law (Denmark, France and Sweden). The category "in policy document" includes targets that have not been proposed as legislation, but that have been described in policy documents such as long-term strategies submitted to the United Nations Framework Convention on Climate Change. A number of countries have climate neutrality targets (net-zero greenhouse gas emissions), which are stronger than carbon-neutral commitments (net-zero CO_2 emissions).

Countries responsible for around one-fifth of global energy-related CO_2 emissions have formulated net-zero emissions ambitions in laws, legislation or policy documents.

Source: IEA *Energy Technology Perspectives 2020*

MEPS & Labels: The framework



"RAISE THE FLOOR!"
Eliminate inefficient products from the market
"Push" manufacturers to produce more efficient appliances and lighting

"RAISE THE CEILING!"
Stimulate consumer demand for energy efficient products
Help manufacturers of appliance and lighting products to overcome investment and market barriers

United for Efficiency Partner Organizations

Manufacturers & Industry Associations

Technical Organizations & Initiatives

Funders & Financiers