



Sectoral Guide on Energy Efficiency

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Acknowledgement to Greenmax Capital

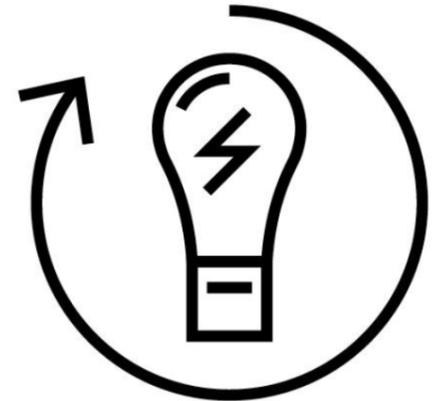
1 June 2022

1. Context

2. Paradigm shifting pathways

3. Case studies

4. Financing paradigm pathways



CONTEXT

Peggy Mischke, Managing Director of Econergy^{PM}
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IN THE NEWS: ENERGY EFFICIENCY, ENERGY SECURITY AND ENERGY SAVINGS ACTIONS

“Energy efficiency is the unsung hero, without which nothing would happen. It would become impossible or very difficult [to reach net zero] if we don’t reduce the amount of energy we consume.”

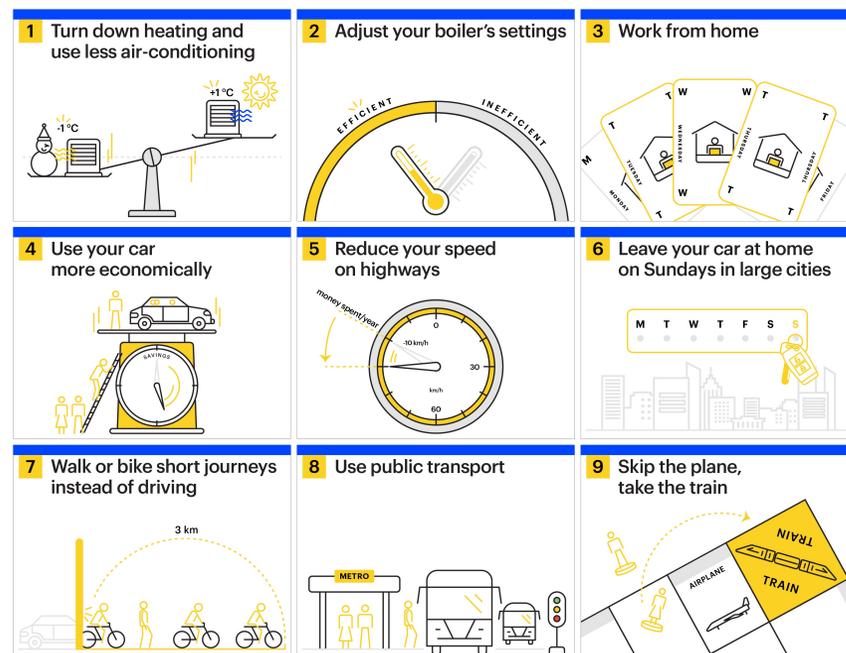
**EU energy
commissioner
Kadri Simson (July
2021).**



Playing my part:

How to **save money**, **reduce reliance on Russian energy**, **support Ukraine** and **help the planet**

iea.org



Key energy savings actions (IEA and EC, April 2022)

“Using less energy is a concrete way to help the Ukrainian people – and to help ourselves [...] and help put us on a path to a cleaner and more sustainable planet.”

**IEA Executive
Director
Dr. Fatih Birol (April
2022).**

GCF SECTORAL GUIDE ON ENERGY EFFICIENCY

GCF Sectoral Guide on Energy Efficiency:

- Industrial energy, material, and resource efficiency practices.
- Energy efficient appliances, standards, and labelling for consumer and small business needs.
- Efficient cooling applications for buildings.
- Efficient energy system planning practices coupling electricity, heating, air conditioning, and ventilation requirements.
- Energy efficient building and city-district design.

Cross-references to other GCF Sectoral Guides:

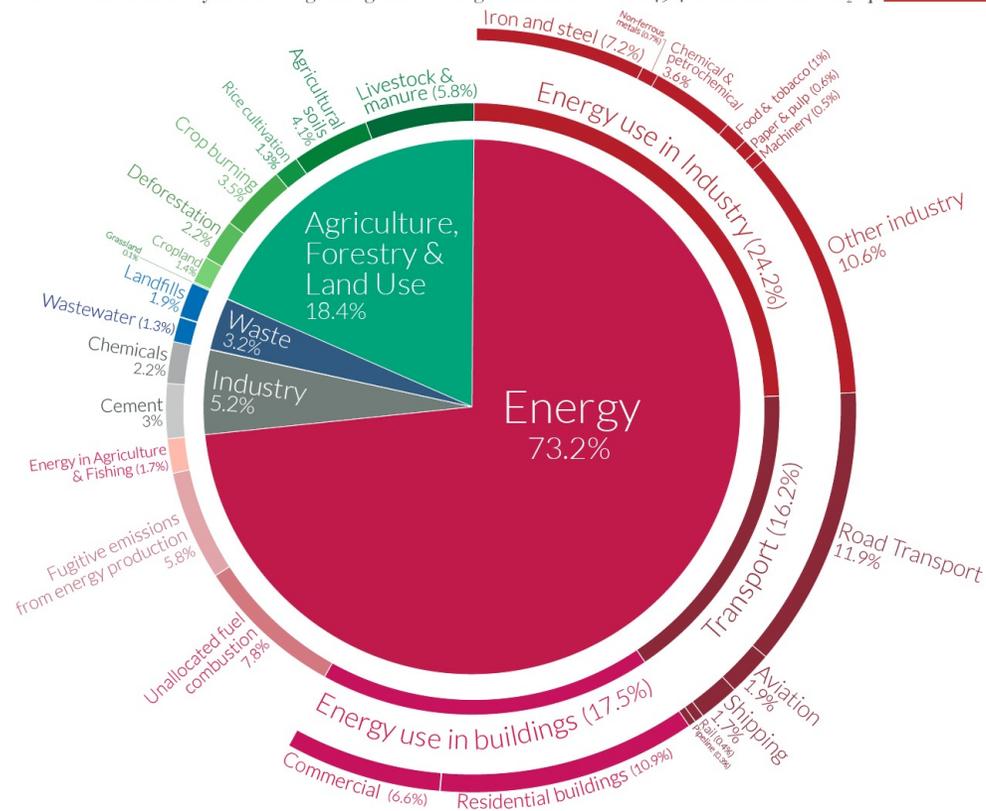
- Agriculture and food security
- Cities, buildings, and urban systems
- Ecosystems and ecosystem Services
- Forests and land use
- Energy generation and access
- Climate information and early warning systems
- Health and wellbeing
- Water Security
- Low emission transport



CURRENT GLOBAL SECTORAL EMISSIONS AND COUNTRY ENERGY INTENSITY BASELINES

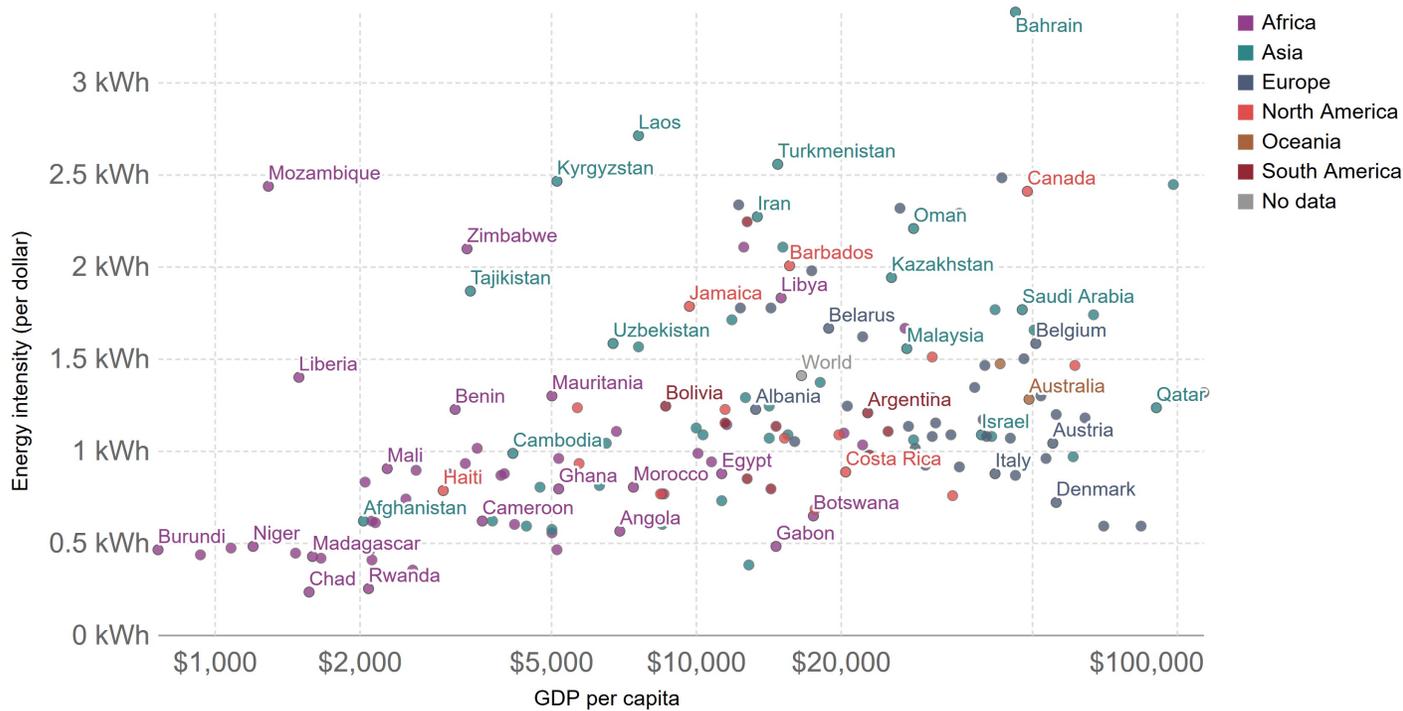
Global greenhouse gas emissions by sector

This is shown for the year 2016 – global greenhouse gas emissions were 49.4 billion tonnes CO₂eq.



Energy intensity vs. GDP per capita, 2018

Energy intensity represents energy consumption per unit of GDP – it's measured in kilowatt-hours per international-\$. The chart shows a positive correlation between GDP per capita and energy intensity across various countries.



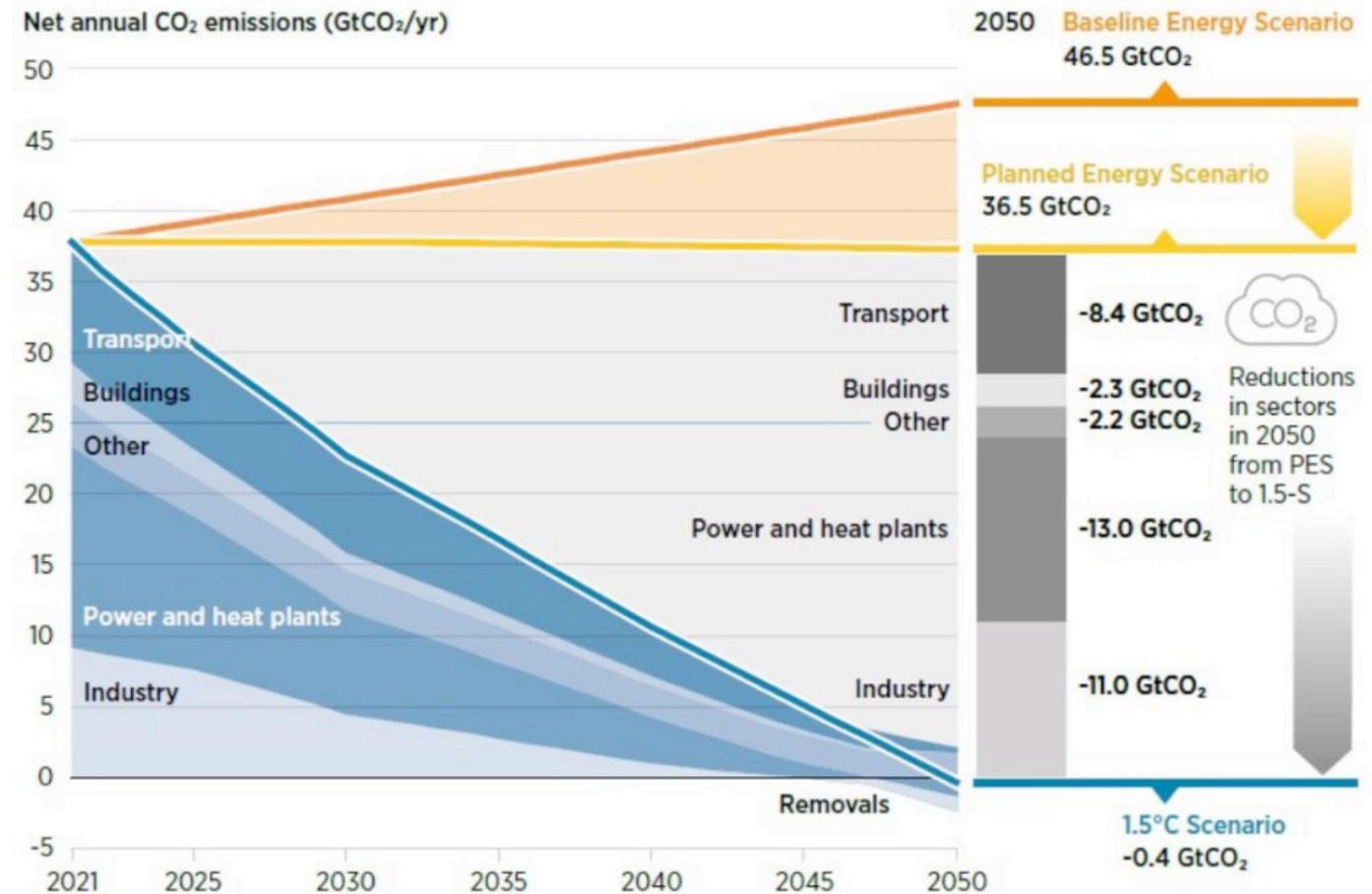
Source: Our World in Data based on BP; EIA; Gapminder & UNWPP; Bolt, Jutta and Jan Luiten van Zanden (2020), Data compiled from multiple sources by World Bank

Note: GDP per capita is measured in constant international-\$ which corrects for inflation and cross-country price differences.

OurWorldInData.org/energy • CC BY

NET-ZERO 2050 TARGETS: ENERGY EFFICIENCY FIRST!

- How to deliver maximum impact? → Think Energy Efficiency First!
- Energy efficiency will need to deliver at least 35% of the cumulative CO₂ savings required by 2050 to reach the goals of the Paris Agreement with a 66% likelihood (IEA, 2018).
- Industrial emissions are expected to fall from current levels by around 11 Gt CO₂eq towards negative levels in 2050 (IRENA, 2021) - while global energy demand from “space” cooling for buildings is projected to triple by 2050 (IEA,2018).

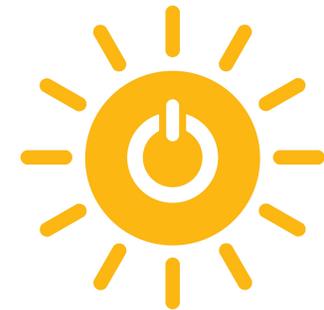


Net-annual CO₂ emission reductions in IRENA's world energy transition 2050 scenario (IRENA, 2021) PES = Primary Energy Supply

ENERGY EFFICIENCY: KEY INDICATOR IN THE UN SUSTAINABLE DEVELOPMENT GOALS (SDGS)

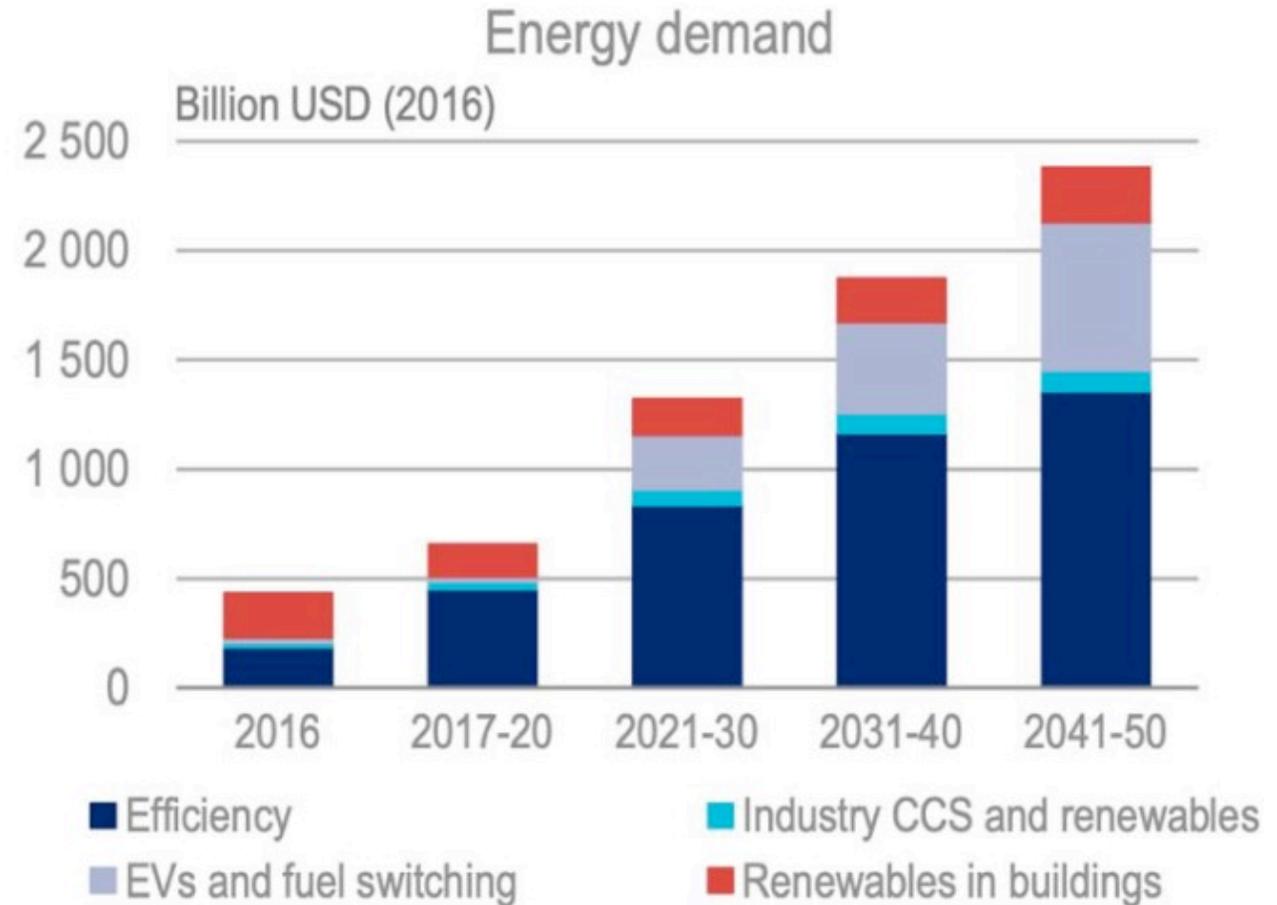
- SDG 7.3: Global target to **double the global rate of improvement in energy efficiency by 2030**
- GCF contribution to SDG 7: enhance **international cooperation** to facilitate access to clean energy research and technology, including [...] **energy efficiency** [...], and **promote investment in energy infrastructure and clean energy technology**
- Energy efficiency remains a critical part of **improving essential industry, energy, health care, education, water, sanitation, and communication infrastructure systems and services** while **adapting to and building resilience against future shocks, such as climate change, and pandemics** (IEA, IRENA, UNSD, World Bank, WHO, 2021).

7 AFFORDABLE AND CLEAN ENERGY



ENERGY EFFICIENCY FINANCING GAP TO OVERCOME

- **Recent actual global investments in energy efficiency have remained stagnant** in the range of USD 230–240 billion during 2016 and 2018 (UNFCCC, 2021).
- **Demand-side investment in low-carbon technologies will need to increase sharply in the coming decades** (IEA, 2016) – not yet accounting for 2021 UNFCCC CoP26 Glasgow NetZero ambitions.
- **Energy Efficiency data sharing to advance!**



IEA average annual global demand-side investment scenario for low-carbon technologies (2016-2050)

ENERGY EFFICIENCY COALITIONS ON THE RISE



european
council for an
energy efficient
economy



PARADIGM SHIFTING PATHWAYS

4-Pronged approach to paradigm shift

01

Transformational
planning



02

Catalysing
innovation



03

Mobilising
finance



04

Knowledge
management
to align
finance and
development



PARADIGM SHIFTING PATHWAYS

Pathway 1. Scaling-up industrial energy efficiency

- Accelerating ambitious shifts to low-emission sources for highly energy-intensive industrial processes, scaling up the use of low-emission feedstocks for priority industrial materials, and catalysing industrial innovations to drastically reduce energy, material, and carbon intensity

Pathway 2. Enhancing “space” energy efficiency

- Reducing emissions from energy consumption in heating, cooling, and lighting in industrial and commercial “spaces”

Pathway 3. Catalysing rapid market switch to highest efficiency appliances/equipment

- Supporting breakthrough energy efficiency programmes across critical super-efficient appliances/equipment supply chains

PARADIGM SHIFT PATHWAY 1

Scaling up industrial energy efficiency pathway

BARRIERS



INDUSTRIAL
DEVELOPMENT POLICY
AND MARKET
UNCERTAINTY



LACK OF AWARENESS ON
BANKABILITY OF
EMERGING
MANUFACTURING
TECHNOLOGIES AND
VALUE CHAINS



CAPITAL SCARCITY TO
FINANCE INNOVATIONS
FOR TECHNOLOGY
CHANGE ACROSS
INDUSTRIAL VALUE
CHAINS IN NASCENT
MARKETS



LACK OF TECHNICAL
EXPERTISE AND/OR
PLANNING CAPACITY
FOR SCALING-UP
INDUSTRIAL ENERGY
EFFICIENCY EFFORTS

POTENTIAL HIGH IMPACT ACTIONS

Transformational planning and programming	Catalyzing Innovation	Mobilizing Large Scale Finance	Knowledge Management
<ul style="list-style-type: none"> Establishing mandatory efficiency standards for energy intensive industry and value chains Developing roadmaps to phase out high emission industrial processes Setting mandatory recycling targets for industrial materials Mainstreaming technical and financial planning and programming Adding National Energy Efficiency Action Plans (NEEAPs) in planning and strategies 	<ul style="list-style-type: none"> Demonstrating technology innovations Substituting fossil fuels with alternative low or zero emissions solutions Introducing innovations in the large-scale reuse/recycling of industrial waste materials. Demonstrating anchor investments in new breakthrough high risk and high potential business models Testing and deploying innovative large-scale market based financial instruments for breakthrough technology innovations 	<ul style="list-style-type: none"> Using policy-based loans. Including guarantees and political risk insurances. Allowing junior equity for early-stage, breakthrough, SME-driven industrial energy efficiency technology adoption in nascent markets for mobilising senior investors. Designing industrial energy specific export financing schemes to strengthen global value chains 	<ul style="list-style-type: none"> Industrial innovations, business models, and emerging financing options to advance industrial energy efficiency regulations Sharing real-time and systemic industrial manufacturing supply-chain emission and resource use data Large-scale partnerships and alliances to enable (voluntary) time-bound decarbonisation targets across global supply chains

PARADIGM SHIFT PATHWAY 2

Enhancing “space” energy efficiency pathway

BARRIERS



REGULATORY AND
LEGISLATIVE BARRIERS
FOR SCALING “SPACE”
EFFICIENCY AT VARIOUS
INSTITUTIONAL LEVELS



LACK OF AWARENESS OF
CLIMATE MITIGATION
AND ADAPTION BENEFITS
OF “SPACE” EFFICIENCY



FINANCIAL BARRIERS FOR
AMBITIONOUS BUILDING,
DISTRICT OR CITY-LEVEL
ENERGY EFFICIENCY
PROGRAMMES



LACK OF TECHNICAL
EXPERTISE TO RAPIDLY
SCALE UP “SPACE”
EFFICIENCY SUCCESS AT
MULTIPLE LEVELS

POTENTIAL HIGH IMPACT ACTIONS

Transformative Planning and programming	Catalyzing Innovation	Mobilizing Large Scale Finance	Knowledge Management
<ul style="list-style-type: none"> • Zero-carbon building design codes with ambitious energy efficiency and material reuse standards, labels, and certificates in nascent markets • Integrating National Cooling Action Plans (NCAPs) and climate adaptive heat action plans with national infrastructure strategies and short-term targets • Ambitious efficiency specifications in public procurement schemes • Building-level energy efficiency driven adaptation/resilience measures by climate adaptation/resilience specific laws and regulations for public and commercial “spaces” 	<ul style="list-style-type: none"> • Piloting city-level, ecosystem-based “space” adaptation approaches • Novel anchor investments for innovations in low-carbon building materials reducing demands • Private-sector driven technology-agnostic energy efficiency, service-based business models, like cooling as a service (CaaS), in high risk and high potential LDCs/SIDS contexts 	<ul style="list-style-type: none"> • Crowding in local currency finance instruments • Pooling and blending public/private debt finance for “space” related “energy efficiency as a service” business models, (e.g., Super-ESCOs, to enable attractive, end-user centric products and solutions at scale) • Integrating technical innovations with de-risking instruments across financial institutions, (e.g., IoT) • Energy benefits for loan guarantees • Standardising demand-side financial instruments for “space” efficiency across financial institutions in emerging markets, such as “green mortgages” or “white certificates”. 	<ul style="list-style-type: none"> • Granular data on super-efficient cooling, heating and lighting business models and investments in risky emerging markets • Open access to MEPS repositories • Advancing state-of-the-art “space” energy efficiency standard developments in developing countries

PARADIGM SHIFT PATHWAY 3

Catalysing rapid market switch to highest efficiency appliances/equipment pathway

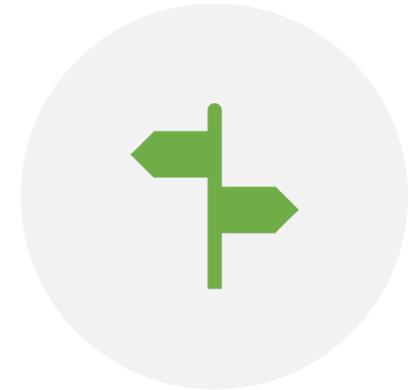
BARRIERS



LACK OF STRATEGIC,
MANAGERIAL, AND TECHNICAL
PLANNING APPROACHES FOR
SCALING BEST-IN-CLASS SUPPLY
CHAINS



LACK OF INNOVATIONS
CENTRED AROUND INCREASING
SOCIAL ACCEPTANCE OF NOVEL
APPLIANCES/ EQUIPMENT



INSUFFICIENT DATA AND
MARKET LINKAGES FOR
ASSESSING BANKABILITY AND
MOBILISING COMMERCIAL
FINANCE

POTENTIAL HIGH IMPACT ACTIONS

Transformative Planning and programming	Catalyzing Innovation	Mobilizing Large Scale Finance	Knowledge Management
<ul style="list-style-type: none"> Programmatic planning integrating a variety of public/private energy efficiency market aggregation partners along various appliances/equipment supply chains. Systemic harmonising and enforcing of MEPS for super-efficient appliances/ equipment across all economic sectors and integration with budgeting/procurement plans at national, regional, and municipal levels. Integrating National Energy Efficiency Action Plans (NEEAPs) with integrated energy sector planning, public procurement, and financial planning. 	<ul style="list-style-type: none"> Piloting supply chain innovations for rapid market switches to best-in-class efficiency appliances/equipment Testing of Internet-of-Things (IoT) driven granular data analytics for proofing appliances/equipment energy demand reductions and cost savings in near-real-time Piloting open, competitive circular economy driven “innovation” challenges for advancing business models centred around best-in-class appliances/equipment deployment and recycling 	<ul style="list-style-type: none"> Scaling portfolios of emerging innovative loan repayment instruments to enable large scale, supply-chain wide financial solutions at attractive commercial terms, for example, via energy performance contract bills, property taxes, utility bills, on-bill financing, vendor financing, on-wage or payroll deduction financing mechanisms Linking Mezzanine finance to best-in-class energy-efficiency standards and labels across consumer appliances/equipment categories in high risk and high potential markets Scaling Energy Saving Insurances in nascent markets 	<ul style="list-style-type: none"> Sharing real-time data and evidence Facilitating best practices in reducing risks for technology adoption and behavioural changes Advancing state-of-the-art appliances/equipment standard developments and regulations in developing countries relating to green public procurement standards with energy efficiency performance specifications.

PARADIGM SHIFTING PATHWAYS

Energy efficiency		Transformational planning & programming	Catalyzing climate Innovation	Mobilization of finance at scale	Coalitions & knowledge to scale up success
Paradigm shifting pathway	Scaling up efficiency in energy-intensive industries	<ul style="list-style-type: none"> Establishing mandatory efficiency standards for energy intensive industry Developing roadmaps to phase out high emission industrial processes Setting mandatory recycling targets for industrial materials Fostering alternative feedstock in steel, cement, chemical Enforcing supply chain carbon targets Setting decarbonisation targets by large players (e.g. Lafarge, Heilberg) Participating in research pilots 	<ul style="list-style-type: none"> Technology innovation in high temperature operations Technical & process-based road maps for system efficiency Electricity and green hydrogen for process heat Innovation in alternative feedstocks Innovation in energy intensity reduction in industrial process Innovation in reuse/recycling of industrial waste material such as feedstocks or composites 	<ul style="list-style-type: none"> Equity for early technology adoption Policy loans Energy efficiency credit lines Supply chain financing (e.g. factoring for suppliers) Service models 	<ul style="list-style-type: none"> Capturing experiences and developing knowledge products on EE business models and financing options Disseminating best practices through GCF knowledge repository and networks Establishing green procurement guidelines for energy efficient services Linking or merging EE building codes with resilience standards for buildings Coordinating knowledge hubs for ISO 50001 implementation Establishing an MEPS repository
	Enhancing "space" energy efficiency	<ul style="list-style-type: none"> Using zero-carbon and green building design and codes with EE markers Adhering to MEPS for space efficiency measures Promoting market stimulation measures such as "zero-carbon" retrofit for public "spaces" 	<ul style="list-style-type: none"> Integrating "ecosystem-based solutions" in building plans Scaling up innovation in building material that significantly reduces energy demand Defining layered building codes Using new business and service models (e.g. super ESCO, cooling as a service) Building integrated Internet-of-Things for space energy demand reduction Switching to Co-gen – Tri-generation from standard HVAC solutions 	<ul style="list-style-type: none"> Aggregated finance models (e.g. hub and spoke) Service models (e.g. ESCOs, bulk procurement) De-risking tools (e.g. guarantee or partial guarantee) Green mortgage/white certificate Energy saving Insurance Government bulk procurement 	
	Enabling market switch to highest efficiency appliance/equipment	<ul style="list-style-type: none"> Adhering to MEPS for Appliance categories Harmonising MEPS across regions Establishing standards and labeling practices Requiring testing and verification practices and labs Adopting green public procurement standards 	<ul style="list-style-type: none"> Innovating supply chains for market switch to high efficiency appliances Adopting Internet-of-Things /data analytics for appliance/equipment energy demand reduction Setting a competitive "innovation" challenge for highest efficiency appliance/equipment Finding innovations in technical verification protocol/digital growth (data) Listing product services in terms of efficient products (e.g. EBRD) 	<ul style="list-style-type: none"> Supply chain capitalisation and financing Vendor financing Standards based credit lines Product based financing Energy saving Insurance 	



FINANCING PARADIGM SHIFT PATHWAYS

Financial barriers

- Lack of available long-term funds and research funds for technology innovations
- Actual and perceived credit risks
- High interest rates of banks in lending to technology service providers, ESCOs and end-users
- Collateral base lending
- Scarcity and high cost of project sponsor equity for large-scale industrial energy efficiency infrastructure projects
- Capex vs Opex



GCF financial instruments





CASE STUDIES



PATHWAY 1 FP140 HIGH IMPACT PROGRAMME FOR THE CORPORATE SECTOR

- **AE:** EBRD
- **Countries:** Armenia, Jordan, Kazakhstan, Morocco, Serbia, Tunisia, Uzbekistan
- **Total Project value:** USD 1 bn
- **GCF:** USD 257.5 million
- **Emission reduction:** 17.2 MtCO₂eq
- Low carbon technologies in industrial sector
- Identification, planning, monitoring
- Risk analysis, gender responsive cc considerations in strategic decision making
- Innovative financing mechanism: linking interest rate to climate & corporate governance performance



PATHWAY 2 + 3 FP 177 COOLING FACILITY

- **AE:** WB
- **Countries:** Bangladesh, El Salvador, Kenya, Malawi, North Macedonia, Panama, Sao Tome and Principe, Somalia, Sri Lanka
- **Total Project Value:** USD 880 million
- **GCF:** USD 157 million
- **CC impacts:** 16.2 MtCO₂eq GHG ERs, 4.22 million people will benefit as direct beneficiaries
- Cooling-related products and services required for buildings, cold chains (e.g. vaccine supply chains), and health facilities
- Business models, regulatory barriers, behavioral aspects, awareness, access to affordable financing



PATHWAYS 2+3 SAP004 ENERGY EFFICIENT CONSUMPTION LOAN PROGRAMME

- **AE:** Xac Bank
- **Country:** Mongolia
- **Total Project Value:** USD 21.5 million
- **GCF:** USD 10 million
- **CC impacts:** 0.47 MtCO₂eq and 15,278 direct beneficiaries
- Heating appliances and EE housing
- Reducing health risks,
- Affordable financing, awareness raising, disposal management old appliances



GCF INVESTMENT CRITERIA FOR IMPACTFUL PROPOSALS

GUIDANCE FOR IMPACTFUL GCF PROJECTS (1)

GCF INVESTMENT CRITERIA

1. Impact potential

- ✓ High climate impact
 - ✓ Technologies, business models, and partnerships in energy-intensive and hard to decarbonise economic sectors and markets
 - ✓ Mitigation as well as adaptation impacts

2. Paradigm shift potential

- ✓ Scalable: robust plan to scale the project/program strategy or technology beyond the funded activity
- ✓ Sustainability: benefits of projects sustained and spur additional climate action for mitigation/adaptation beyond GCF funds
- ✓ Replicability: Support to key structural elements of the project or program that can be replicated nationally and/or internationally
- ✓ Innovation

3. Sustainable development potential

- ✓ Environmental, social, gender, and economic co-benefits that align with national priorities
- ✓ GCF environmental and social policies

GUIDANCE FOR IMPACTFUL GCF PROJECTS (2)

GCF INVESTMENT CRITERIA

4. Recipient needs

- ✓ Climate vulnerability and financing needs of the beneficiary country and population
- ✓ Along with the mitigation impact, adaptation measures to be highlighted
- ✓ Strategic partnerships

5. Country ownership

- ✓ To align with the given country's national and local plans, policies, and institutional structures,
- ✓ To address the beneficiary country ownership of, and capacity to implement, a funded project or program, policies, climate strategies, and institutions
- ✓ Engagement with all stakeholders in value chain

6. Efficiency and effectiveness

- ✓ Crowding in private sector investments
- ✓ High cost-efficiency of the expected impacts (i.e. cost per tCO₂eq) and financing leverage
- ✓ Strategic Partnerships



THANK YOU!

Questions & Comments



GREEN
CLIMATE
FUND

**Raising
ambition.**
**Empowering
action.**