



# How can the Energy Sector undergo a Green Transition?

- ❖ Part 1: Approaches and Tools
- ❖ Part II: Strategic and Programmatic Guidance





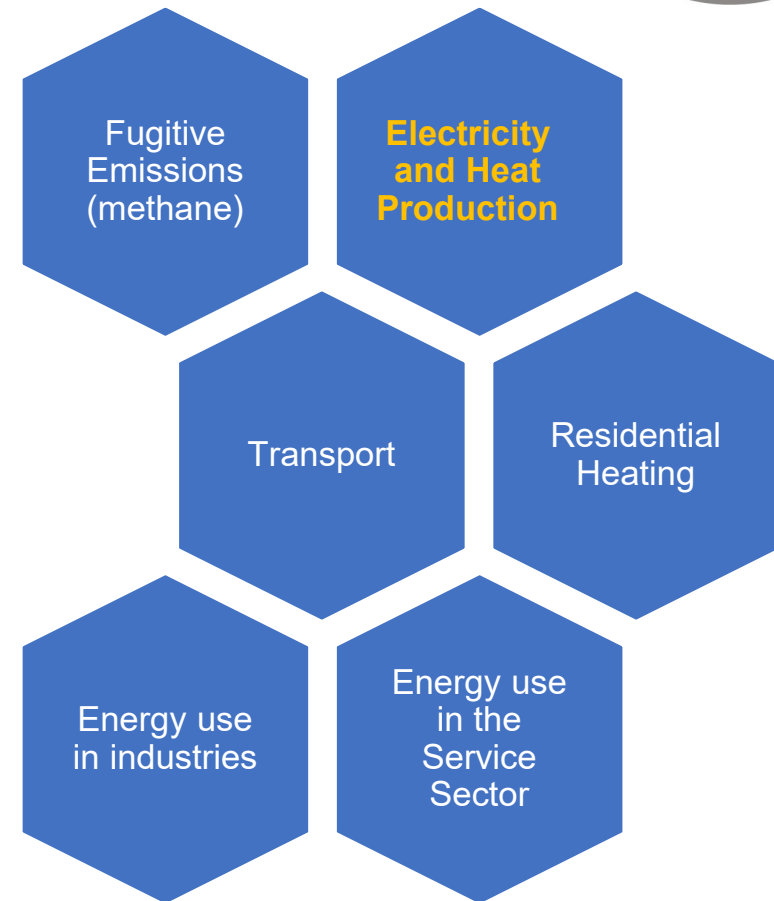
# Overview of Issues to be Covered

- How is the needed Energy Transition addressed at global, regional and national level?
  - How can the energy crisis be dealt with?
  - What tools and databases can help to design and guide the transition?
  - What are possible interventions?
  - What are our benefits?
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# Role of Energy in Green Transitions

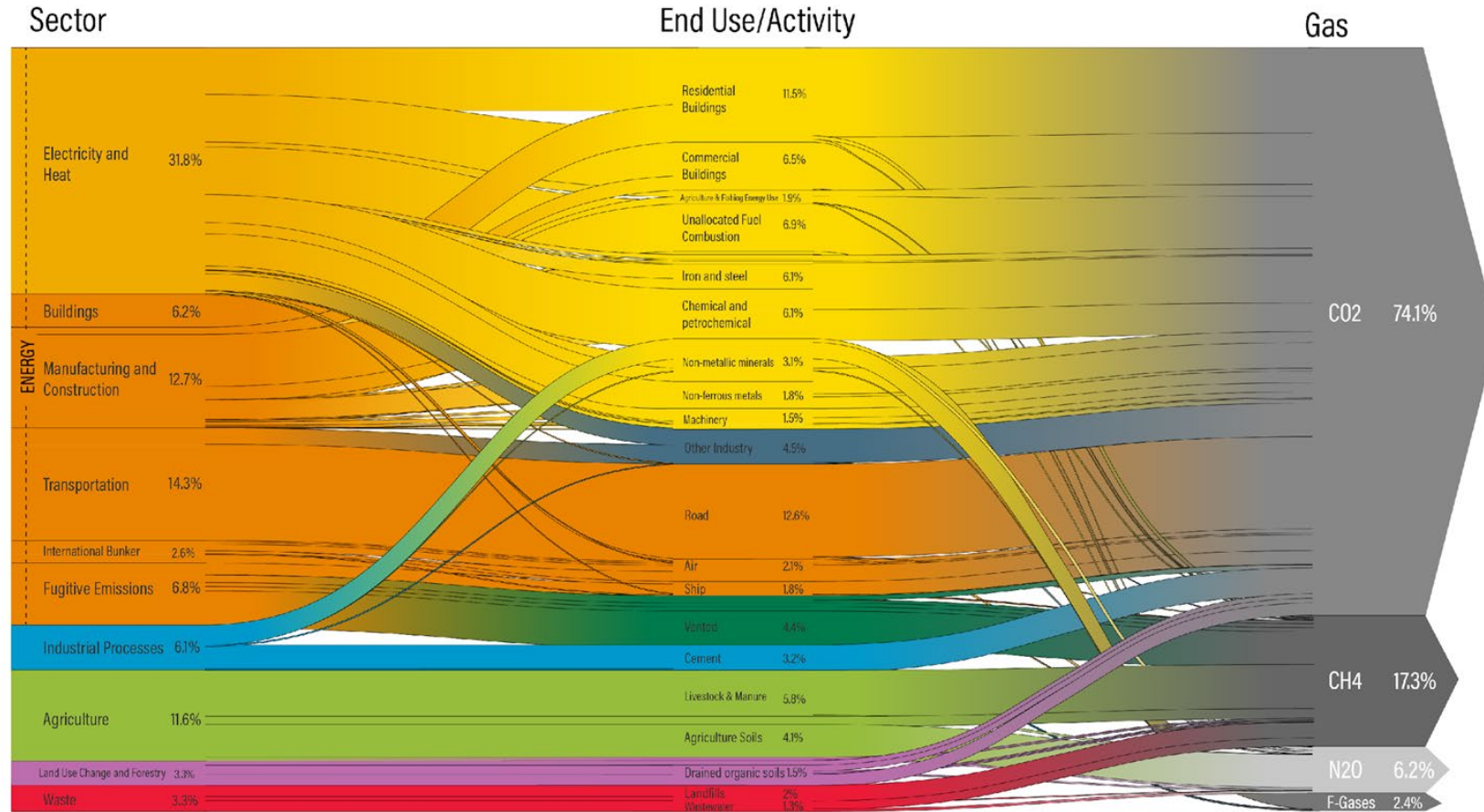
- The energy sector is THE sector to be addressed
- There is more than electricity production!
- There is more than natural gas, oil and coal!
  
- There is a range of intervention opportunities!





World Greenhouse Gas Emissions in 2019 (Sector | End Use | Gas)

Total: 49.8 GtCO<sub>2</sub>e



Target the energy supply AND the consumption

Source: Climate Watch, based on raw data from IEA (2021), GHG Emissions from Fuel Combustion, [www.iea.org/statistics](http://www.iea.org/statistics); modified by WRI.

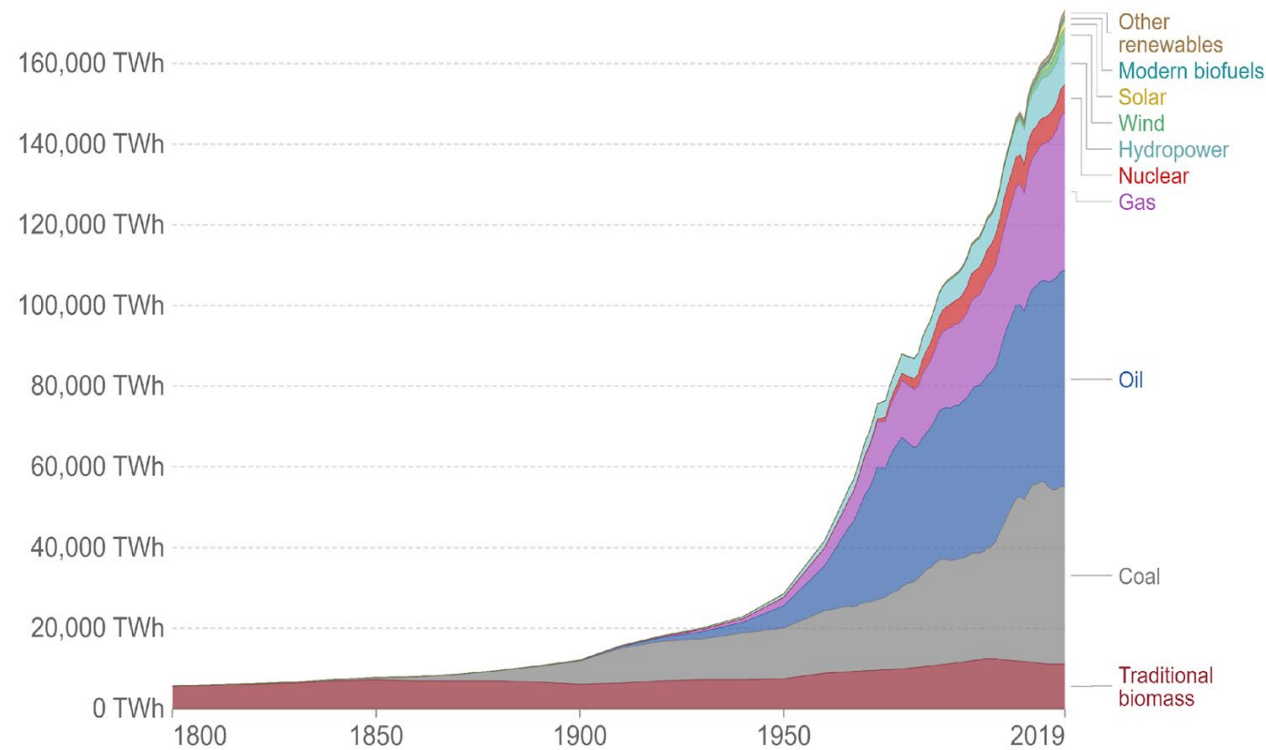


# Energy Transition in History

## Global primary energy consumption by source

Primary energy is calculated based on the 'substitution method' which takes account of the inefficiencies in fossil fuel production by converting non-fossil energy into the energy inputs required if they had the same conversion losses as fossil fuels.

Our World  
in Data



This is not the first  
energy transition!

But this one does  
not simply happen!

Source: Vaclav Smil (2017) & BP Statistical Review of World Energy

OurWorldInData.org/energy • CC BY



# Part I

## Approaches and Tools for a Green Transition in the Energy Sector

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# Subtopic 1: Global, Regional & National Approaches

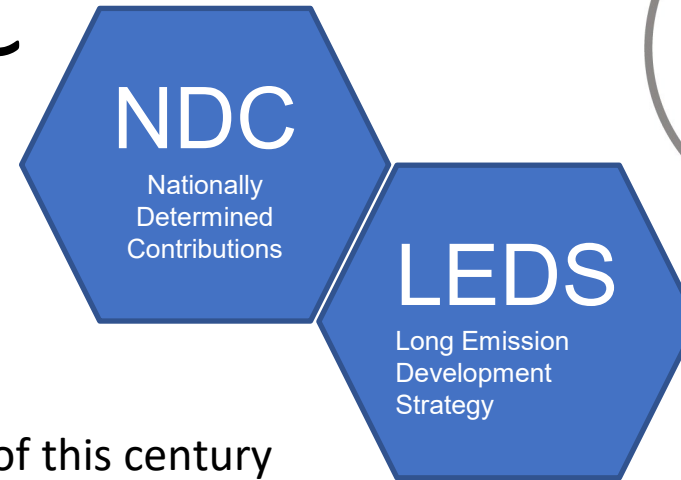


What is the global ambition?

How does the European Union go climate-neutral?

What are country-approaches?

# Global Approach - UNFCCC



## Paris Agreement (2015), Article 4:

... reach global peaking of GHG emissions as soon as possible ....

....balance between emissions and removals in the second half of this century

... on the basis of equity and in the context of sustainable development and efforts to eradicate poverty

## Glasgow Climate Pact (2021) – 1/CMA.3,

36. Calls upon Parties to accelerate the development, deployment and dissemination of technologies, and the adoption of policies, to transition towards low-emission energy systems, including by rapidly scaling up the deployment of clean power generation and energy efficiency measures, including accelerating efforts towards the phasedown of unabated coal power and phase-out of inefficient fossil fuel subsidies, while providing targeted support to the poorest and most vulnerable in line with national circumstances and recognizing the need for support towards a just transition;





# European Approach – EU Green Deal



## The European Green Deal:

- climate neutrality by 2050
- reduction of net GHG emission by 55% by 2030

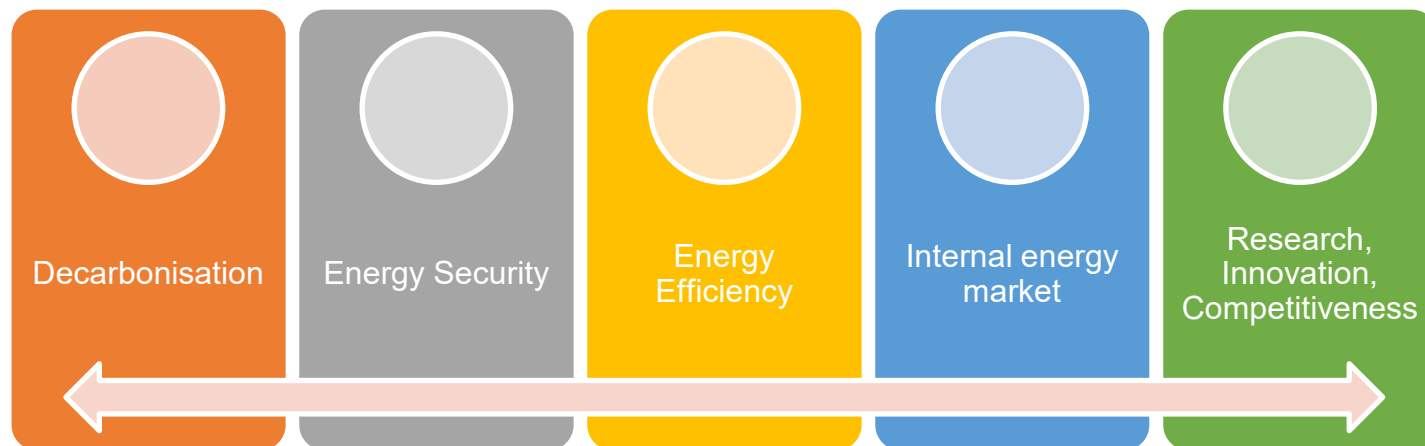
## Clean Energy Transition – Principles:

- ensuring a secure and affordable EU energy supply
- developing a fully integrated, interconnected and digitalised EU energy market
- prioritising energy efficiency, improving the energy performance of our buildings and developing a power sector based largely on renewable sources

# EU Governance Mechanism



- To help the EU reaching its 2030 climate and energy targets
- common rules for planning, reporting and monitoring
- Harmonised with ambition cycles of Paris Agreement



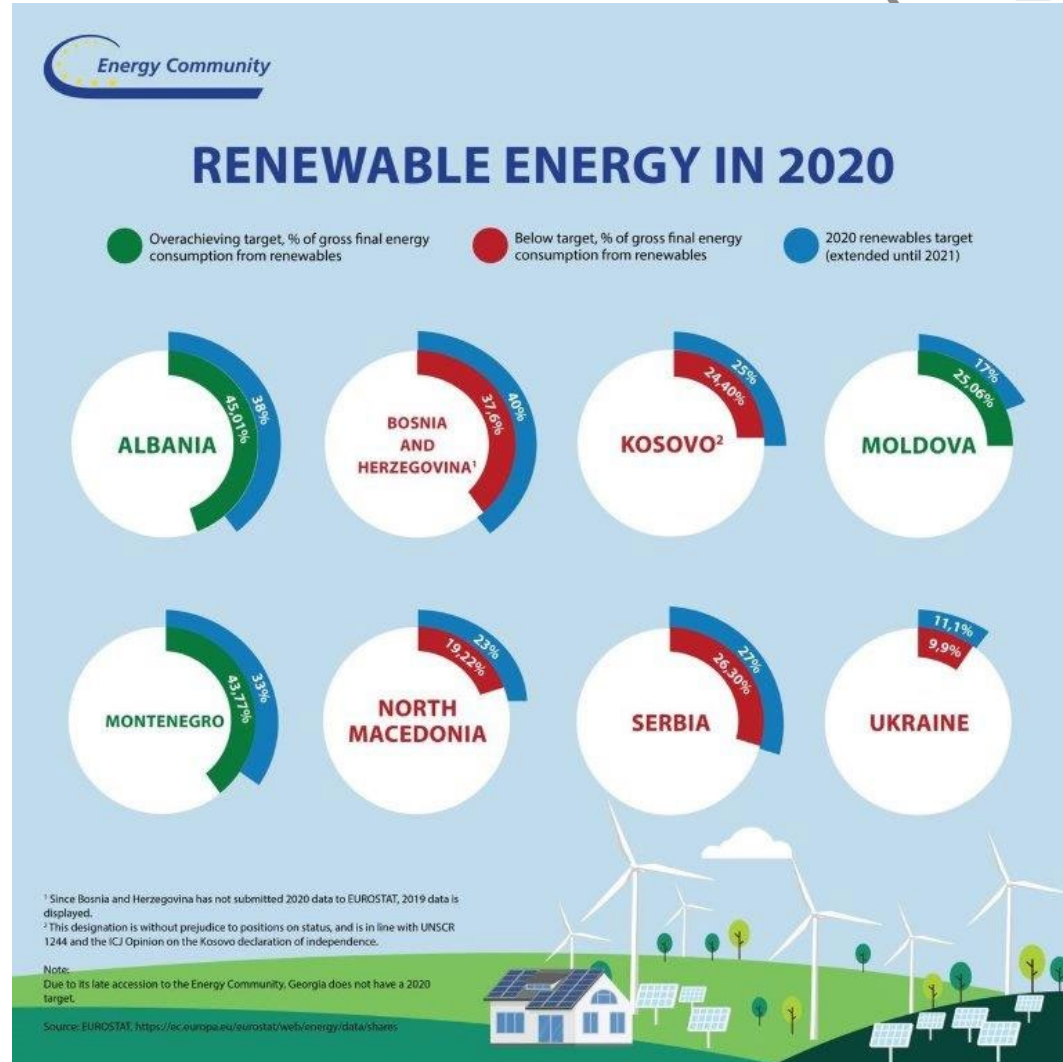
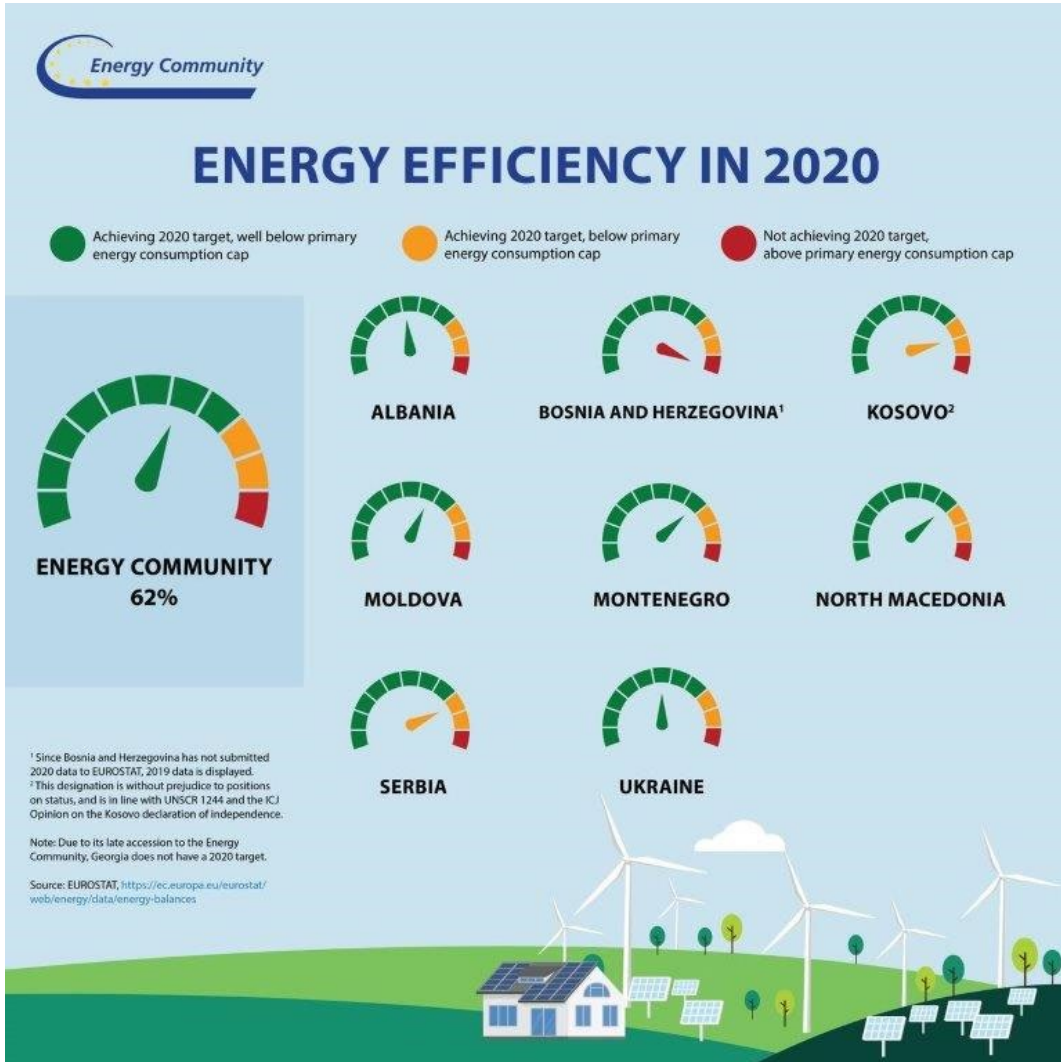
2030: EU renewable target 32% (40%?)

2030: EU EE target 32,5% (39% PEC, 36% FEC?)

Targets will be increased  
 REPowerEU plan

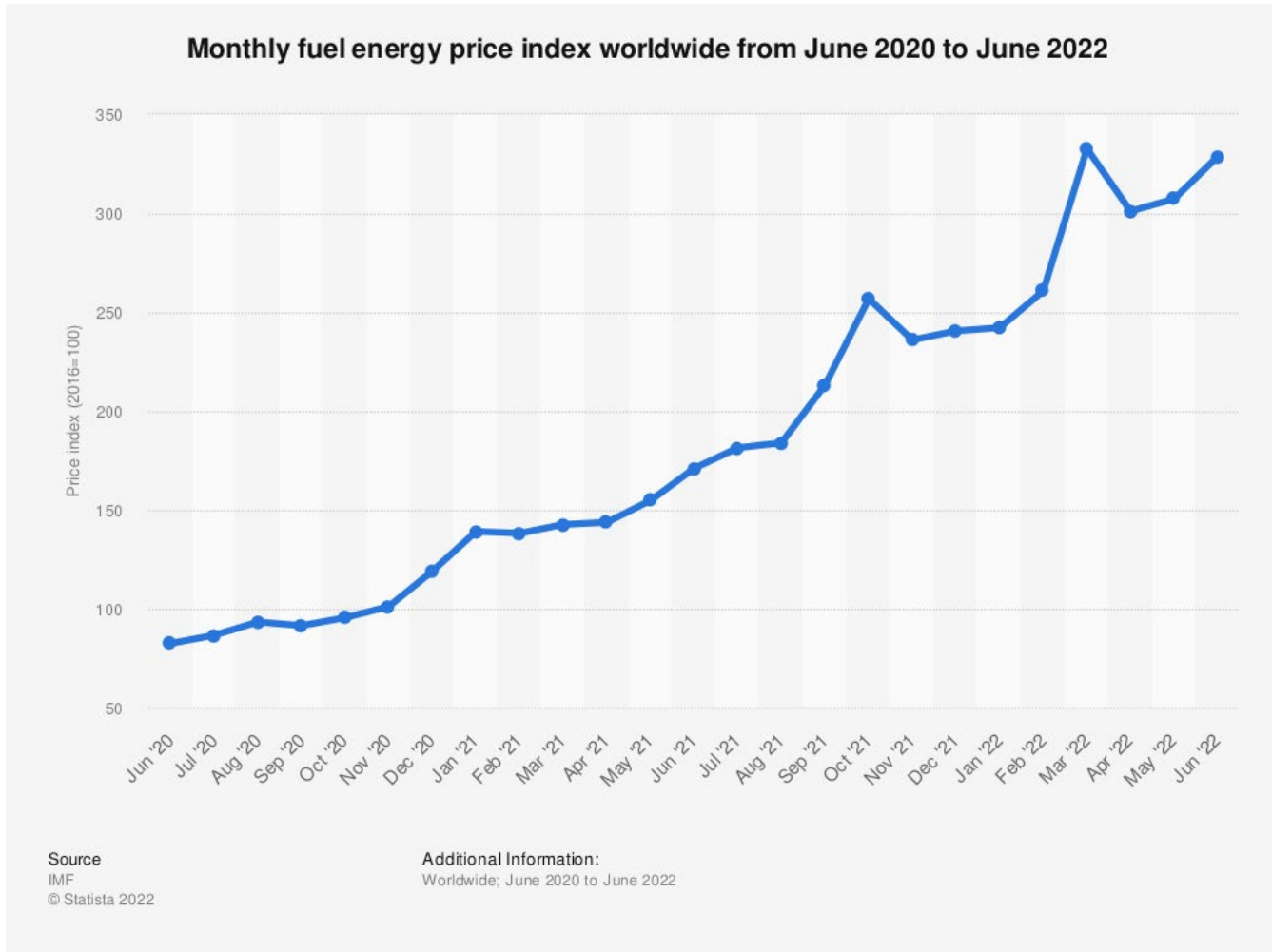


# National Approaches – Energy targets



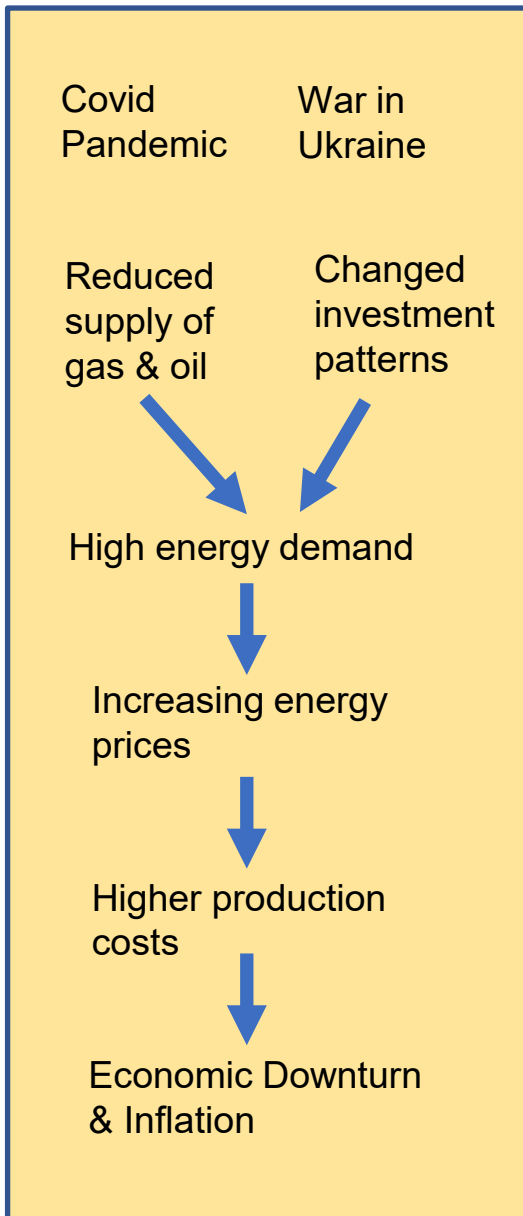


# Subtopic 2: Energy Crisis





# Energy Crisis & its Impacts



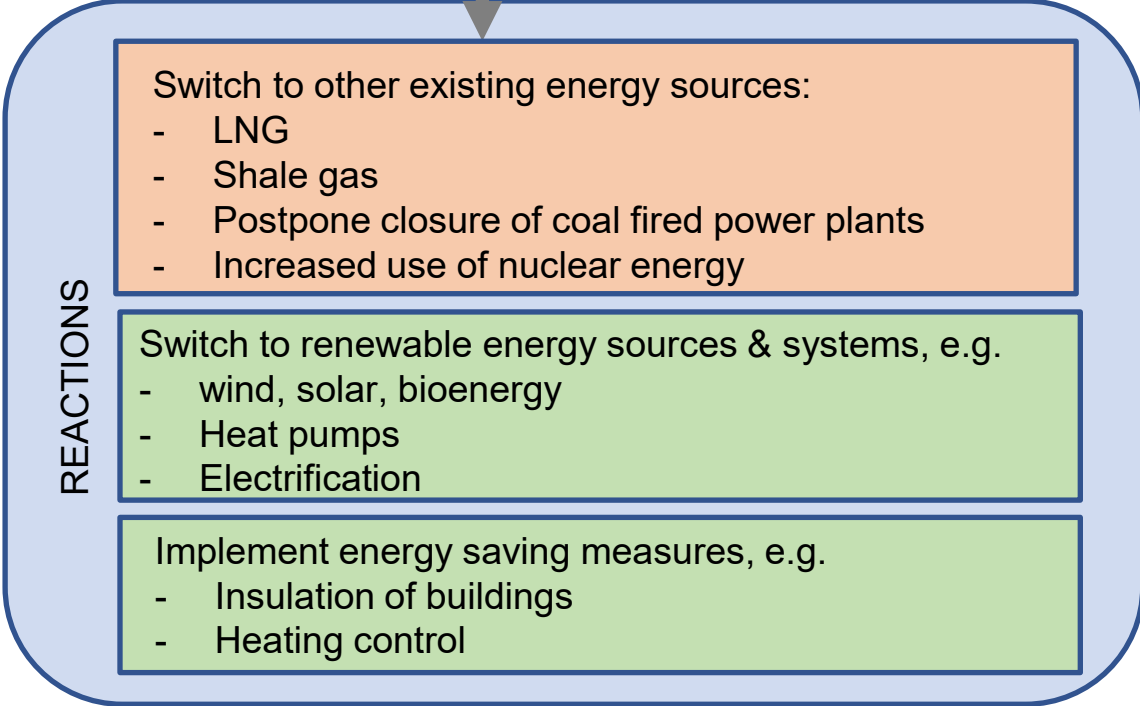
Financial windfalls for oil and gas sector

Additional Investment needs

Increased energy poverty

Increased living costs

Social discontent





Measures implemented this year could **bring down gas imports from Russia by over one-third**, with additional temporary options to deepen these cuts to **well over half while still lowering emissions**.

# IEA: 10-Point-Plan

- Gas: diversify supply, storage capacities, no more Russian gas
- Power sector: wind, solar, bioenergy, nuclear, manage electricity prices
- End-use sectors: replace gas boilers with heat pumps, energy efficiency measures, heating control
- Cross-cutting: increase flexibility of power system

Study accessible at: <https://www.iea.org/reports/a-10-point-plan-to-reduce-the-european-unions-reliance-on-russian-natural-gas>

## Action 1



### No new gas supply contracts with Russia

Impact: Taking advantage of expiring long-term contracts with Russia will reduce the contractual minimum take-or-pay levels for Russian imports and enable greater diversity of supply.

## Action 2



### Replace Russian supplies with gas from alternative sources

Impact: Around 30 bcm in additional gas supply from non-Russian sources.

## Action 3



### Introduce minimum gas storage obligations to enhance market resilience

Impact: Enhances the resilience of the gas system, although higher injection requirements to refill storage in 2022 will add to gas demand and prop up gas prices.

## Action 4



### Accelerate the deployment of new wind and solar projects

Impact: An additional 35 TWh of generation from new renewable projects over the next year, over and above the already anticipated growth from these sources, bringing down gas use by 6 bcm.

## Action 5



### Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Impact: An additional 70 TWh of power generation from existing dispatchable low emissions sources, reducing gas use for electricity by 13 bcm.

## Action 6



### Enact short-term measures to shelter vulnerable electricity consumers from high prices

Impact: Brings down energy bills for consumers even when natural gas prices remain high, making available up to EUR 200 billion to cushion impacts on vulnerable groups.

## Action 7



### Speed up the replacement of gas boilers with heat pumps

Impact: Reduces gas use for heating by an additional 2 bcm in one year.

## Action 8



### Accelerate energy efficiency improvements in buildings and industry

Impact: Reduces gas consumption for heat by close to an additional 2 bcm within a year, lowering energy bills, enhancing comfort and boosting industrial competitiveness.

## Action 9



### Encourage a temporary thermostat adjustment by consumers

Impact: Turning down the thermostat for buildings' heating by 1°C would reduce gas demand by some 10 bcm a year.

## Action 10



### Step up efforts to diversify and decarbonise sources of power system flexibility

Impact: A major near-term push on innovation can, over time, loosen the strong links between natural gas supply and Europe's electricity security. Real-time electricity price signals can unlock more flexible demand, in turn reducing expensive and gas-intensive peak supply needs.



# Subtopic 3: Tools & Databases

There is a lot of material available ...

- ❖ Energy Transition toolkit - World Energy Council
  - ❖ Carbon Neutrality toolkit - UNECE
  - ❖ Fossil Fuel Subsidy simulator – UNDP
  - ❖ Net zero by 2050 – Report by International Energy Agency
  - ❖ De-risking renewable energy investment – Framework by UNDP
  - ❖ IRENA Flextool - International Renewable Energy Agency
  - ❖ ...
-



# Energy Transition Toolkit (1/3)

- Developed by World Energy Council
- Designed for energy stakeholders
- Tools available:
  - [Issues monitor](#)
  - [Energy Trilemma Index](#)
  - World Energy Scenarios: 3 scenarios until 2040
  - World Energy Pulse (study)
  - Innovation Insights: hydrogen, blockchain, sector coupling, etc. (studies)
  - World Energy Transition Radar





# Energy Transition Tool (2/3)- Monitor



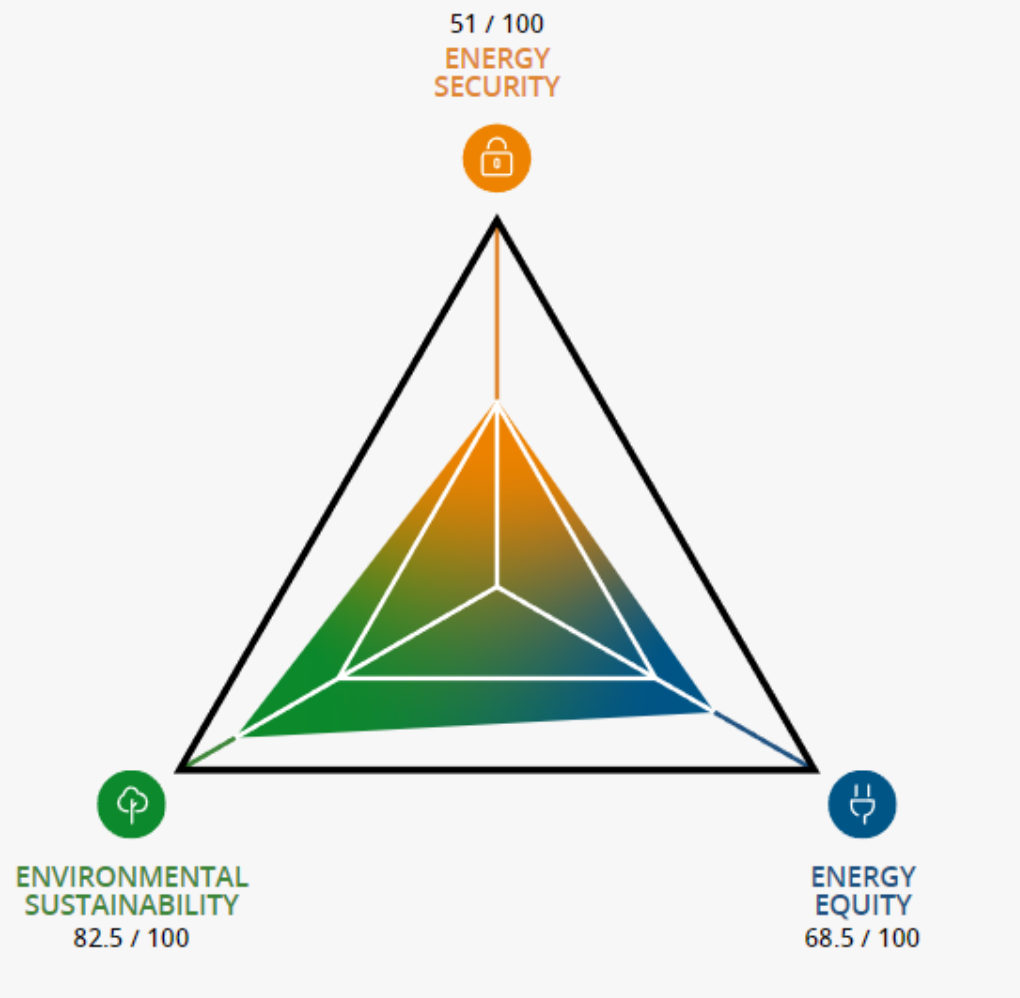
To understand the complex environment in which energy leader must operate

**Critical Uncertainties**  
**Action Priorities**

# Energy Transition Tool (3/3) - Trilemma



## Balance





## Albania

Trilemma Rank  
# 47

Trilemma Score  
65.6


Balance Grade  
CCA

Albania gets a high score for Environmental Sustainability due to the low carbon electricity generation and CO<sub>2</sub> emissions per capita. The Energy Equity index is backed by high rates of access to electricity and affordable electricity prices, and there is room for improvement in access to clean cooking. Energy security is the least scoring indicator due to the low diversity of electricity generation and limited storage capacity. The country's global ranking has slipped from 43 in 2020 to 47 in 2021. The 2021 Trilemma grade for Albania is CCA.



### Carbon Neutrality Toolkit

Supporting policymakers to make informed decisions towards the implementation of the 2030 Agenda for Sustainable Development and the Paris Agreement.





**TECHNOLOGY BRIEF**  
**CARBON CAPTURE, USE AND STORAGE (CCUS)**



**TECHNOLOGY BRIEF**  
**HYDROGEN**



**TECHNOLOGY BRIEF**  
**NUCLEAR POWER**

UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

**Carbon Neutrality in the UNECE Region:**  
**Integrated Life-cycle Assessment**  
**of Electricity Sources**



UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

**Carbon Neutrality in the UNECE Region**  
**Technology Interplay under the**  
**Carbon Neutrality Concept**





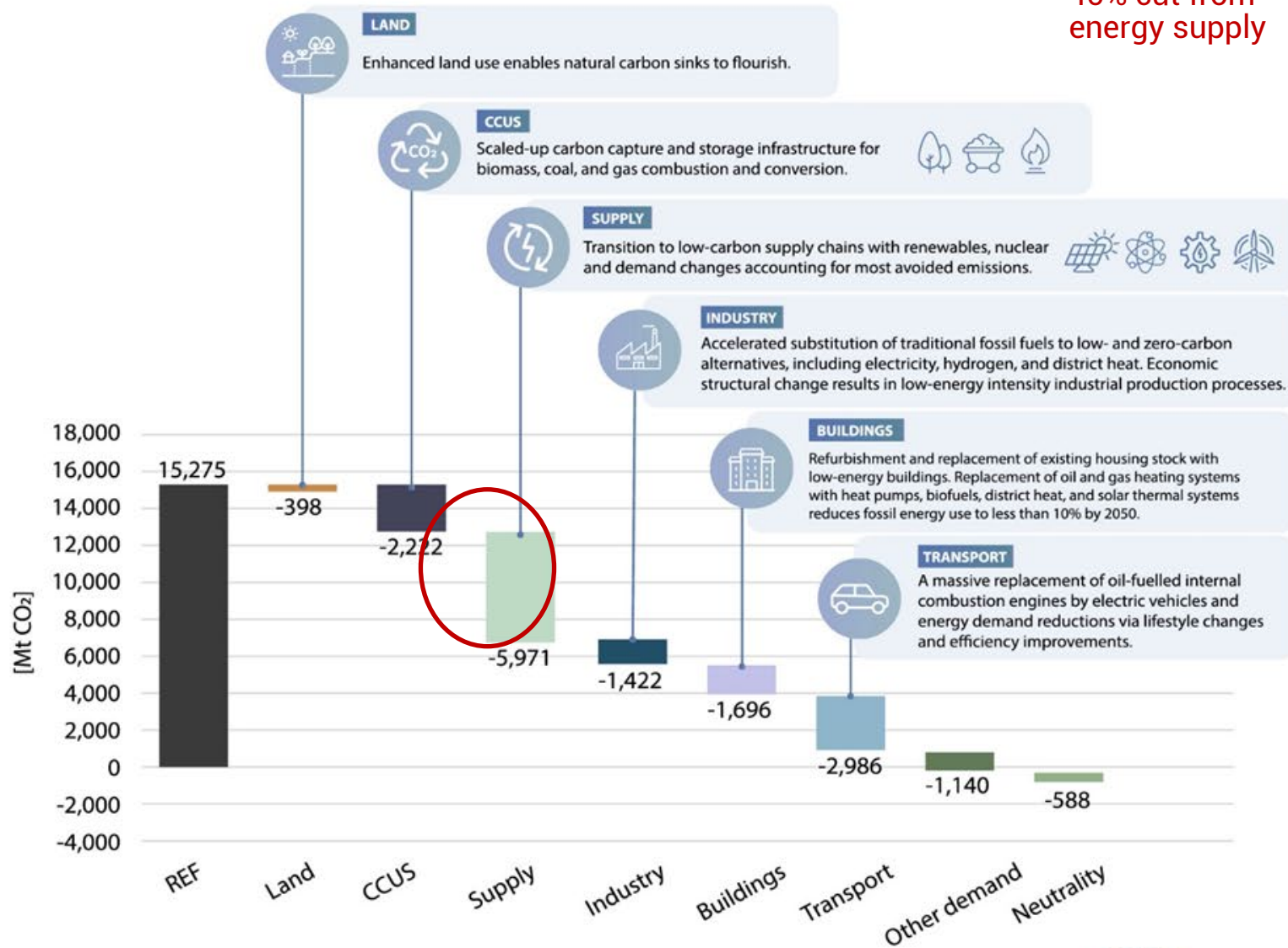
# Carbon Neutral Energy System of the Future



# Actions are needed across sectors

How can different energy sectors be decarbonized?

40% cut from energy supply



CO<sub>2</sub> mitigation [MtCO<sub>2</sub>/yr.] in UNECE, Neutrality vs. Reference Scenarios



# Fossil Fuel Subsidy Simulator (1/2)

- Developed by UNDP
- interactive simulator to explore different scenarios of fossil fuel subsidy reforms and their impacts.
- Analysis of the consequences in reallocating a specific share of subsidies
  - Impact on vulnerable people
  - Impact on welfare
- Interactive tool: select country, reallocation rate and approach
- Country specific information



# Fossil fuel subsidy simulator (2/2)

**Kazakhstan** Spends \$547 Million monthly on Fossil Fuel Subsidies

On  Price-gap approach  Inventory approach

Reallocating 50% of the subsidy to Temporary Base Income

50%

**Temporary Base Income (TBI):** A minimum guaranteed income above the poverty line, for vulnerable people.

TOP-UP	HALF-MEDIAN	UNIFORM
A cash transfer equivalent to each country's average shortfall in income in relation to the corresponding vulnerability threshold.	A cash transfer equivalent to half the median household per capita income or consumption in each country.	A uniform cash transfer of \$5.58 a day.

Using **MEDIAN** approach can cover

## Impact on Vulnerable People

IMPACT ON WELFARE >>

Reallocating 50% of their subsidies, could cover 14.00% of TBI under a MEDIAN approach or 1 Million people.

### Total population



### Vulnerable population



### Beneficiaries covered by reallocation



Example:  
Kazakhstan





# Net Zero by 2050 (IEA)

Scenario built on

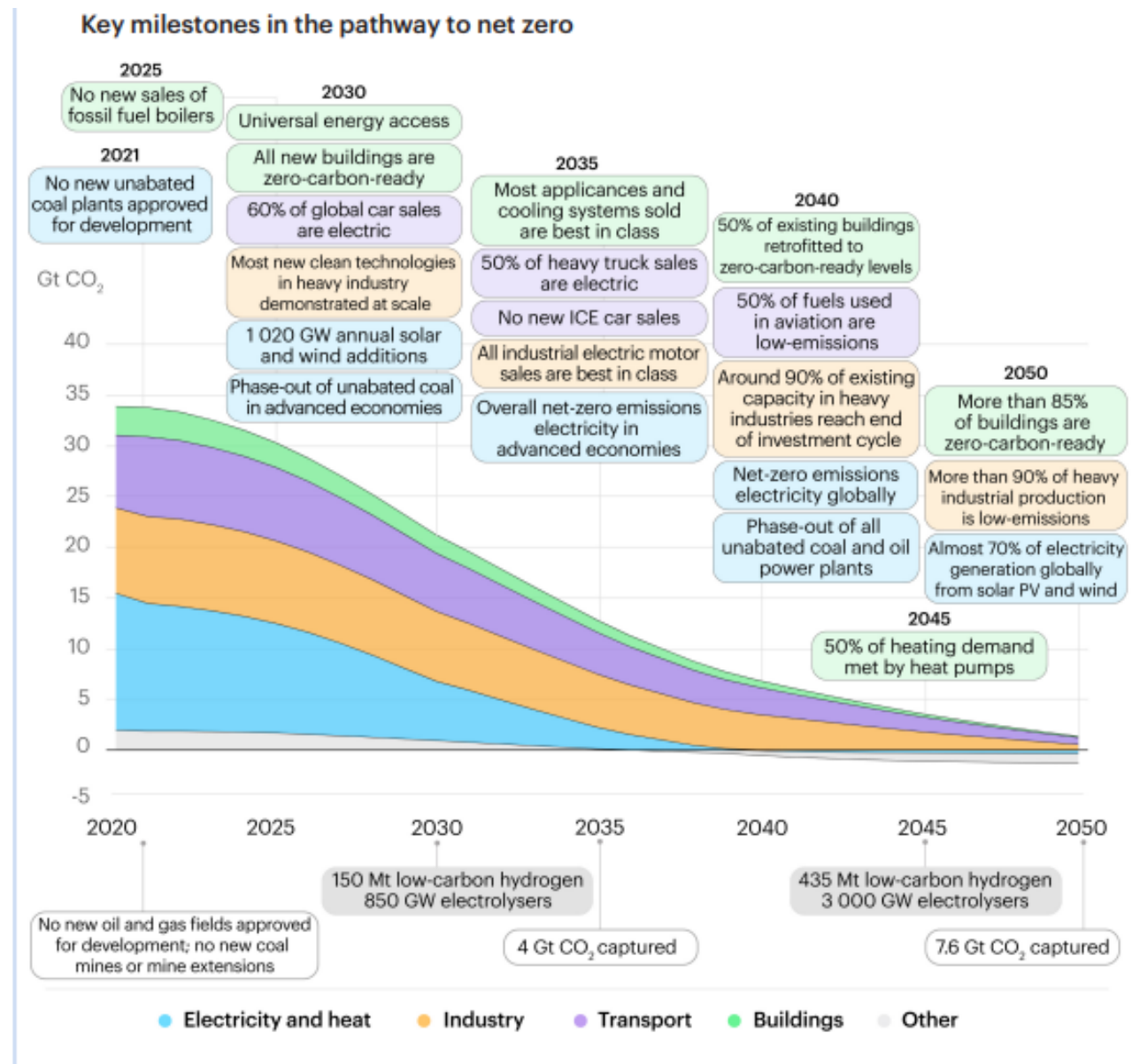
- uptake of all the available technologies and emissions reduction options is dictated by costs, technology maturity, policy preferences, and market and country conditions.
- All countries co-operate towards achieving net zero emissions worldwide. (□ just transition)
- An orderly transition across the energy sector.

Worldwide scenario

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# Net Zero by 2050

- A Roadmap for the Global Energy Sector
- World's first comprehensive study of how to transition to a net zero energy system by 2050 while ensuring stable and affordable energy supplies, providing universal energy access, and enabling robust economic growth.



Summary for Policy Makers



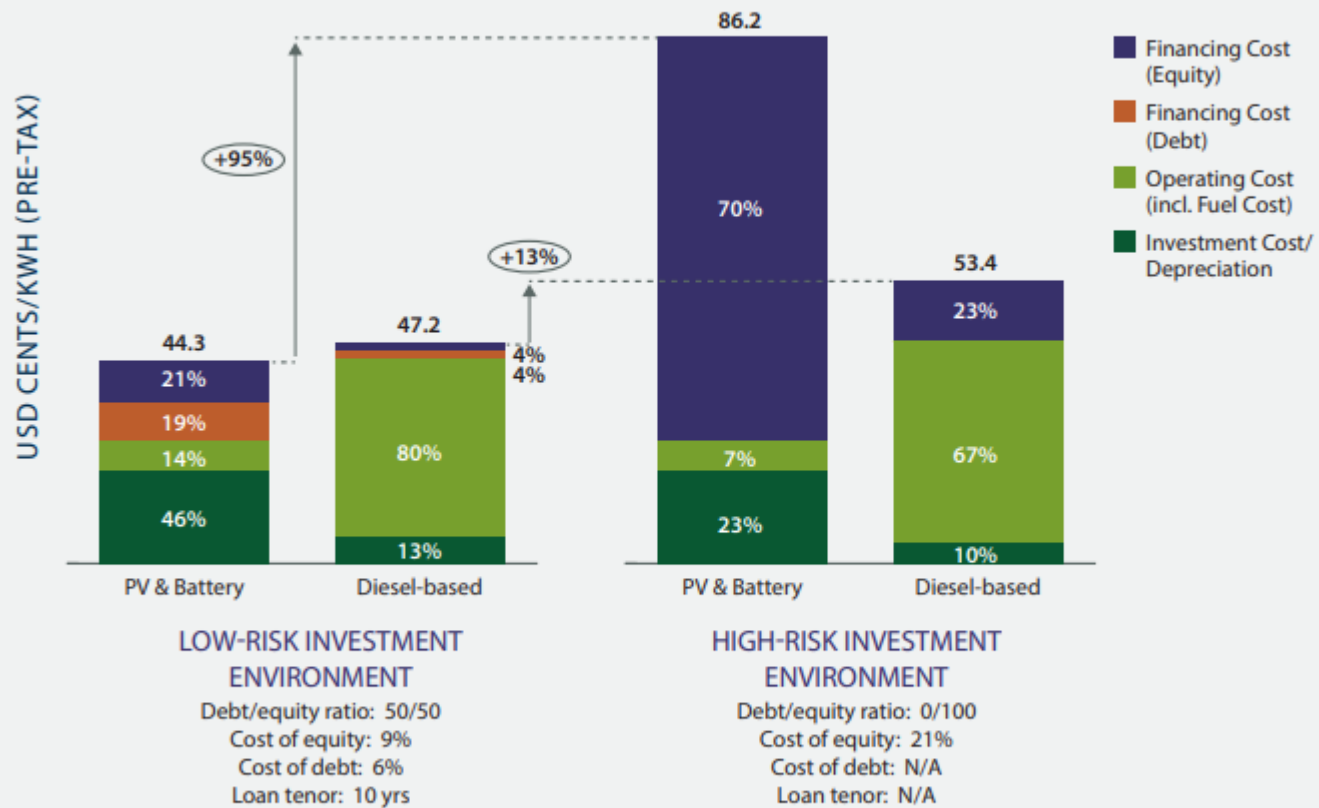
# De-risking renewable energy investment - DREI (1/2) by UNDP

- For policy makers to identify cost-effective instruments to promote and scale-up private sector investments
- Identify risks and then intervene by either reducing, transferring or compensating the risks
- DREI framework covers: publicly-available methodologies, financial tools/models and resources
- Sources covered: (i) utility-scale, (ii) on-grid rooftop PV, (iii) off-grid mini-grids, and (iv) solar home systems.



# DREI- off-grid Electrification (2/2)

Figure E.1: Impact of financing costs on solar PV-battery and diesel-powered mini-grids' generation cost in low and high-risk investment environments<sup>1</sup>



Source: Authors' modelling.

Due to their capital intensity, solar mini-grids are penalized in high financing cost environments.

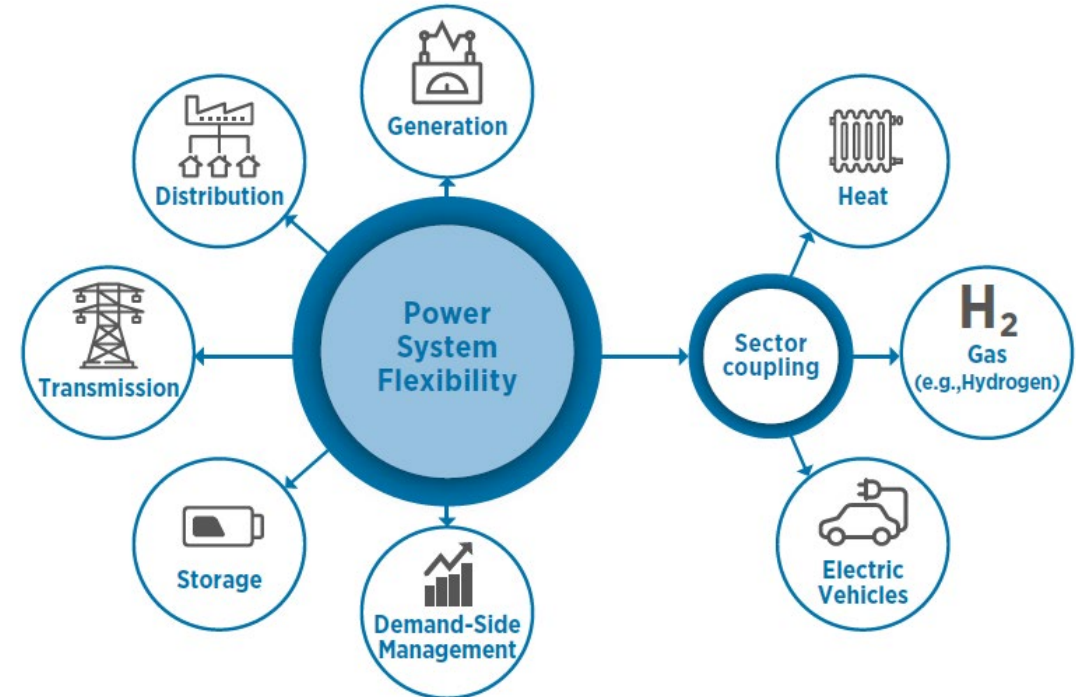
- Reduce risk
- Transfer risk
- Compensate risk



# IRENA Flex tool (1/1)

- By International Renewable Energy Agency
- “Flexibility is the capability of a power system to cope with the variability and uncertainty that solar and wind energy introduce at different time scales, from the very short to the long term, avoiding curtailment of power from these variable renewable energy (VRE) sources and reliably supplying all customer energy demand.” (IRENA, 2019)
- assessment of potential flexibility gaps as well as highlighting the most cost-effective mix of solutions to fill in such gaps
- Input required: demand, generation mix, hydrological data, VRE time series, interconnections and fuel costs.
- publicly and freely available (open-source) tool

Figure 3: Power system flexibility enablers in the energy sector





# Part II

## Strategic and Programmatic Guidance for a Green Energy Transition

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# Key interventions: Decarbonising the Energy Sector

Energy savings	District Heating & Cooling	Sector coupling	Low carbon mobility
Electrification	Renewable energy sources	New technologies: Hydrogen, ...	Carbon Capture & Storage
Energy Storage	Smart Grids	Behavioural Change	Carbon pricing
Phase out fossil fuel subsidies	Interconnection	Avoid fugitive emissions	Digitalisation

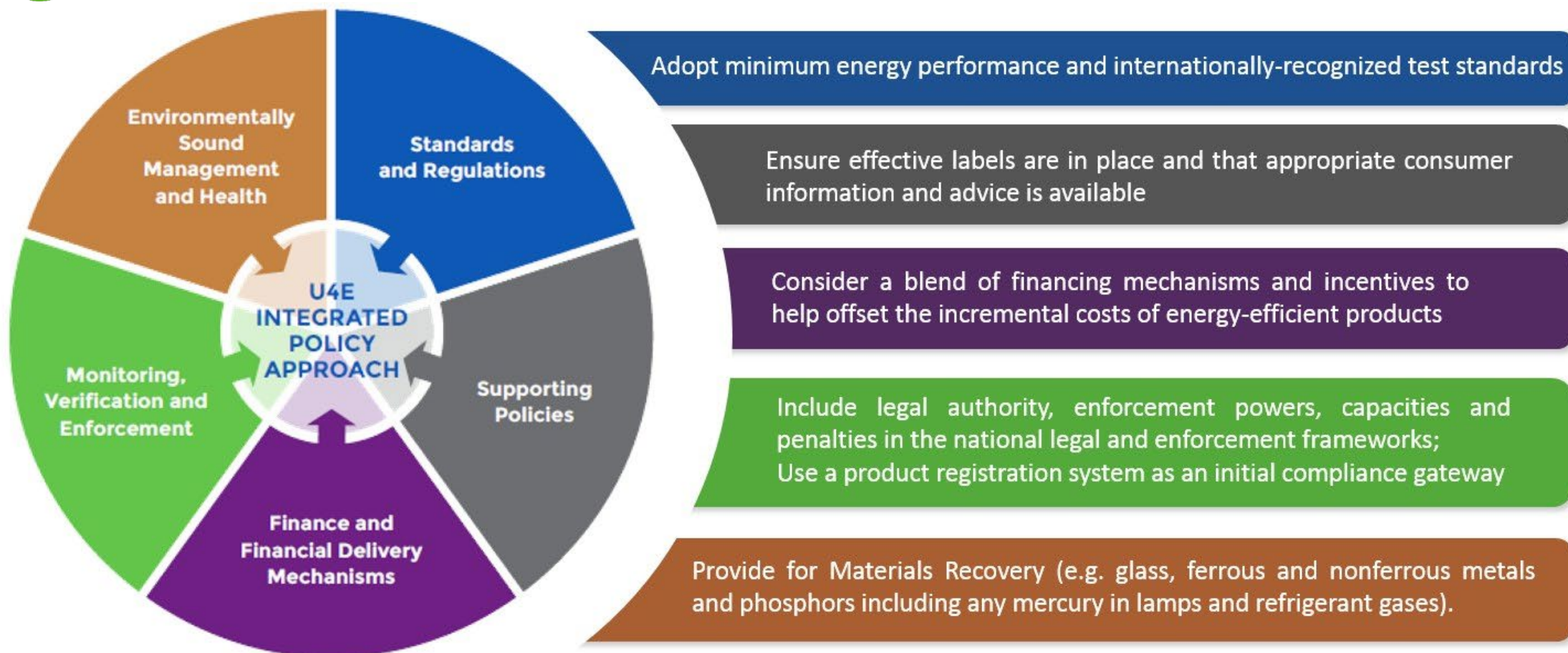
Move  
away  
from  
Business  
as Usual



# Intervention 1: United for Efficiency (1/5)



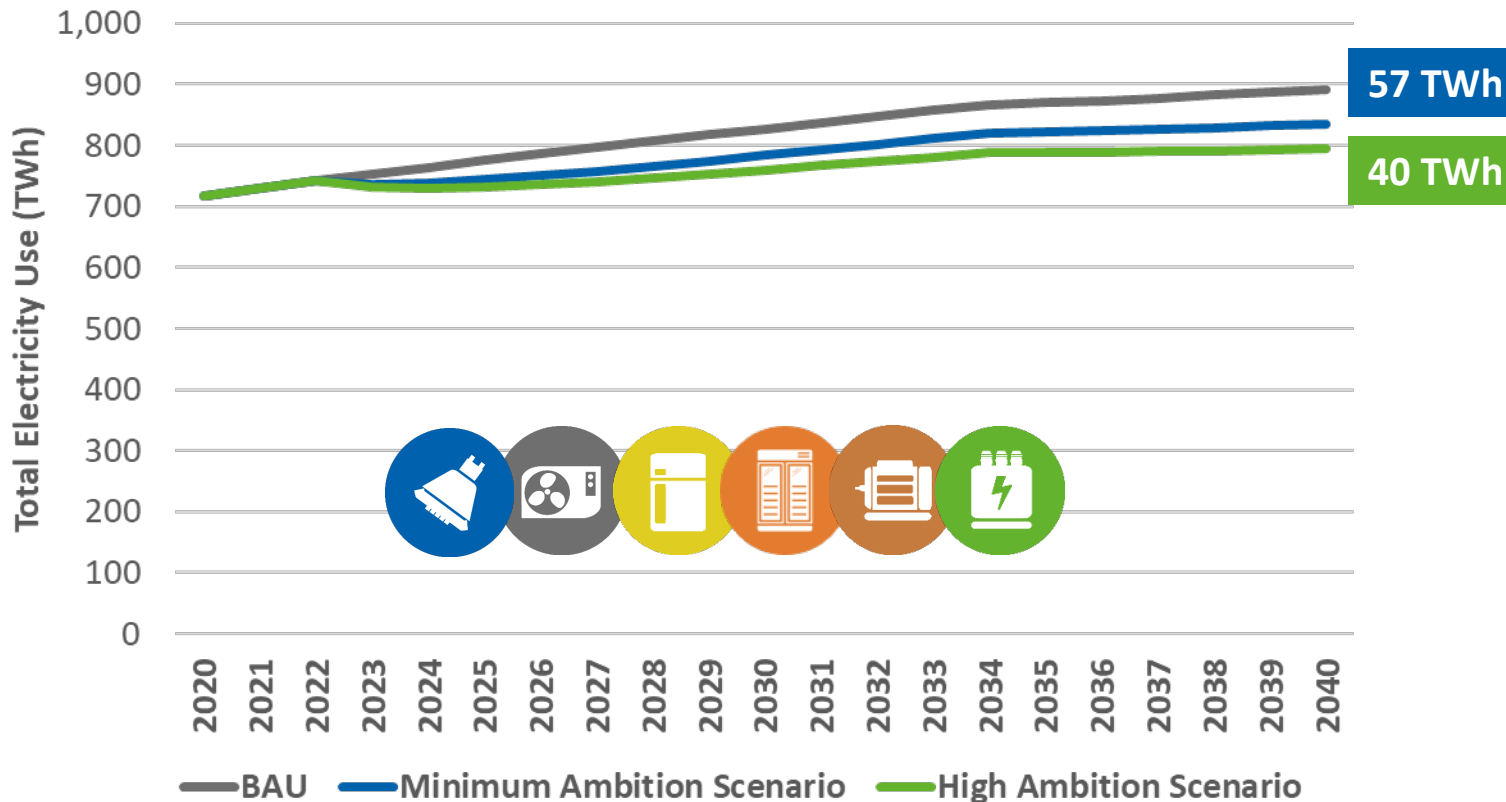
U4E supporting emerging and developing economies to accelerate their transition to energy efficient and climate friendly products through an Integrated Policy Approach







# Saving Opportunities in MENA from Energy-Efficient Lighting, Appliances and Equipment (2/5)



## Annual Savings in 2040\*:

57 TWh of electricity consumption, which is equivalent to:

- **26+ Power stations** [500 MW each]
- **33 Million tonnes of CO<sub>2</sub>**
- **5.2 Billion USD on electricity bills**

# Country Savings Assessments (3/5)

## Objective

Analysis on potential impact of adopting Model Regulation guidelines for lighting, room air conditioners, residential refrigerators, commercial refrigeration equipment, industrial electric motors and distribution transformers.

These product categories are responsible for >50% of electricity usage today.

## Overview

- The assessment provides three scenarios: **Business As Usual Scenario (BAU)**– No policy intervention; **Minimum Ambition Scenario** – assumes Minimum Energy Performance Standards (MEPS) implemented; **High Ambition Scenario** – Assumes MEPS are implemented at a higher level of ambition for six products.
- The **energy savings potential** is calculated till 2040 and is computed based on the difference between total energy consumption in the ambition scenarios and that of the BAU scenario and is expressed in terms of **GHG emissions mitigated, Capacity (Power plants) avoidance and Financial savings.**



### COUNTRY SAVINGS ASSESSMENT

#### Kazakhstan

**INTRODUCTION**

The Country Savings assessments provide a summary of the benefits attained from improved energy efficiency and climate friendly lighting, cooling appliances, and equipment. A market transformation can be obtained through measures such as Minimum Energy Performance Standards (MEPS); product labelling; market monitoring and verification; and financial incentives. For each product, the analysis considers three different scenarios:

- Business As Usual:** Assumes that no actions are introduced and that the efficiency of products in the market continues to develop in line with historical trends in the absence of regulation.
- Minimum Ambition:** In which MEPS are introduced in line with the basic requirements of the United Nations Environment Programme (UNEP) United for Efficiency (U4E) Model Regulation Guidelines.
- High Ambition:** In which more ambitious actions are implemented in line with the highest levels proposed in the Model Regulation Guidelines.

More detailed breakdowns for lighting, cooling appliances and equipment can be found on the UNEP U4E website.

**REPORT CONTENTS**

- Page 1 Introduction
- Page 2 Overview of benefits
- Page 3 Higher ambition to help reach energy and climate goals
- Page 4 Detailed benefits and typical product assumptions
- Page 5 Savings potential in context
- Page 6 Country data, product assumptions and methodology

Logos: Clean Cooling Collaborator, UNEP U4E, UN Environment Programme, UN, gef, UN Environment Programme.

### OVERVIEW OF BENEFITS

**ANNUAL SAVINGS IN 2040\***

- Reduce electricity use by over **6.7 TWh** which is over **5.5 %** of the total current electricity use
- Save electricity worth over **300 million US\$** equivalent to more than **3 power plants (500MW each)**
- Reduce electricity CO<sub>2</sub> emissions by over **6.7 million tonnes** equivalent to over **3.7 million passenger cars**

**ELECTRICITY SAVINGS OVER TIME\***

**OTHER BENEFITS ACHIEVED IN 2040\***

- Reduced annual electricity savings by **79 million US\$**
- Reduced cumulative direct GHG emissions by **6 million tonnes**

\* Savings based on Minimum Ambition Scenario

### HIGHER AMBITION TO HELP REACH ENERGY AND CLIMATE GOALS

THE MORE AMBITIOUS THE REGULATION, THE MORE SAVINGS ARE POSSIBLE

By 2040, electricity consumption is projected to increase by **29%**. Minimum Ambition policies could reduce this increase to **1.7%**. More ambitious policies could further reduce this increase to **10%**.

**MEET GLOBAL CLIMATE GOALS BY SIGNIFICANTLY DECREASING EMISSIONS**

**PRODUCT SHARE OF CO<sub>2</sub> EMISSIONS SAVINGS BY 2040 AND 2040\***

\* Savings based on Minimum Ambition Scenario

### DETAILED BENEFITS AND TYPICAL PRODUCT ASSUMPTIONS

**ANNUAL SAVINGS IN 2030 AND 2040\***

Product	2030	2040	2030	2040	2030	2040
Cooling	1,400	2,700	150	420	290	580
Electricity (TWh)	60	120	6.4	18	13	26
CO <sub>2</sub> Emissions (thousand tonnes)	1,400	2,700	150	420	290	580
Lighting and Equipment	1,300	100	1,500	2,200	300	710
Electricity (TWh)	59	4.4	50	17	13	12
CO <sub>2</sub> Emissions (thousand tonnes)	1,300	100	1,500	2,200	300	710

**CUMULATIVE SAVINGS BY 2030 AND 2040\***

Product	2030	2040	2030	2040	2030	2040
Cooling	6.1	28	0.7	3.6	1.3	6.0
Electricity (TWh)	270	1,200	29	160	58	270
CO <sub>2</sub> Emissions (million tonnes)	6.1	28	0.7	3.6	1.3	6.0
Lighting and Equipment	12	17	4.9	23	1.3	6.6
Electricity (TWh)	530	730	220	1,000	57	200
CO <sub>2</sub> Emissions (million tonnes)	12	17	4.9	23	1.3	6.6

**PRODUCT CONTRIBUTION TO CUMULATIVE ELECTRICITY USE & SAVINGS BY 2040**

**SAVINGS SHARE BY 2040:**

Scenario	Lighting	Residential Refrigerators	Commercial Refrigeration	Room Air Conditioners	Industrial Electric Motors	Distribution Transformers
Business As Usual	20%	18%	34%	32%	4%	8%
Minimum Ambition	20%	18%	34%	32%	4%	8%
High Ambition	20%	18%	34%	32%	4%	8%

\* Savings based on Minimum Ambition Scenario

### SAVINGS POTENTIAL IN CONTEXT

**OTHER OPPORTUNITIES COMPARED WITH MEPS BY 2040**

Minimum Energy Performance Standards are developed specifically to improve product efficiency in a market, but other important steps can be taken to reduce electricity consumption further.

**ROOM AIR CONDITIONERS**

- Ensuring products are correctly sized at the time of installation
- Implementing best practice ongoing maintenance practices
- Raising the temperature set point for MEPS-compliant units from 22°C can save between 6-10% per degree up to 27°C
- The use of control systems, sensors and thermal zoning. The savings from AC controls varies greatly depending on the situation but typical savings can be:
  - 28-35% for small offices
  - 32-35% for small retail
  - 24% for supermarkets

**LIGHTING**

- Occupancy & daylight sensors used in all appropriate settings can typically save up to:
  - 40% in commercial settings
  - 30% in industrial settings
- Dimming controls at off-peak times can typically save as much as:
  - 25% for street lighting

**INDUSTRIAL ELECTRIC MOTORS**

- The use of Variable Speed Drives in all suitable applications could give an average saving of as much as:
  - 20% when used with pumps
  - 20% when used with fans/blowers
  - 10% when used with compressors
  - 5% when used in mechanical applications

**DISTRIBUTION TRANSFORMERS - SMART GRIDS**

The main savings opportunities for distribution transformers come from management practices such as:

- Ensuring transformers are correctly sized at the time of installation
- Implementing best practice ongoing maintenance and re-winding methods

Using Smart Grids brings other benefits including:

- Reducing projected increases in peak demand by as much as 24%; allowing:
  - reduced capacity overall
  - delays in maintenance/replacement requirements
  - reduced CO<sub>2</sub> emissions from peaking plant
- Allowing improved integration of distributed and renewable generation, and more electric cars both with associated CO<sub>2</sub> emissions benefits

### COUNTRY DATA, TYPICAL PRODUCT ASSUMPTIONS AND METHODOLOGY

**GENERAL INFORMATION**

Population	19 million	Residential electricity tariff	0.04 US\$/kWh
GDP per capita	5,574 US\$	Transmission and distribution loss factor	6.7%
Specification level	2007		
CO <sub>2</sub> emission factor	0.73 kg/kWh		

**TYPICAL PRODUCT ASSUMPTIONS**

Product	2022 Unit Energy Consumption (kWh/year) or Efficiency Level	Type of Product
Lighting	As Usual, Minimum Ambition Scenario, High Ambition Scenario	LED
Residential Refrigerators	589, 263, 181	2-door refrigerator freezer of energy efficient class with automatic defrost, energy saving, low noise level, inverter compressor, and cooling system.
Commercial Refrigeration	4,659, 3,968, 2,912	At least 0.15 kW and 100 litres with a variable speed compressor and cooling system.
Room Air Conditioners	579, 413, 303	At least 0.15 kW and 100 litres with a variable speed compressor and cooling system.
Industrial Electric Motors (100 kW)	IE0, IE2, IE3	Variable speed drive motor with a variable speed drive.
Distribution Transformers (MVA)	See notes	Level 1, Level 2

**METHODOLOGY**

The analysis uses the UNEP U4E Country Savings Assessment Method to estimate the impacts of implementing policies that improve the energy efficiency of each product. The brief methodology is provided below (omitted U4E for more information).

- The cooling analysis for refrigerators, commercial refrigeration and air conditioners uses a bottom-up model approach embedded within the market data on typical product performance. Future growth is projected based on established relationships between ownership and other known macroeconomic indicators.
- The lighting analysis uses a bottom-up model with market data on typical products to estimate current lighting demand. This is projected forwards in line with IFA estimates of future building electricity use. It is then used with an estimate of future average efficacy to calculate electricity consumption. This efficacy is based on assumptions about future trends in lamp usage and product efficacy in different scenarios.
- The equipment module on both top-down estimates. The electricity use of motors is based on its typical relationship to industrial GDP, while distribution transformers are based on the typical capacity required for a total national electricity demand. Electricity use is shared between several typical products and applications based on market data. In both cases, the improvement in average stock efficiency is based on end-of-life stock turnover and new sales.

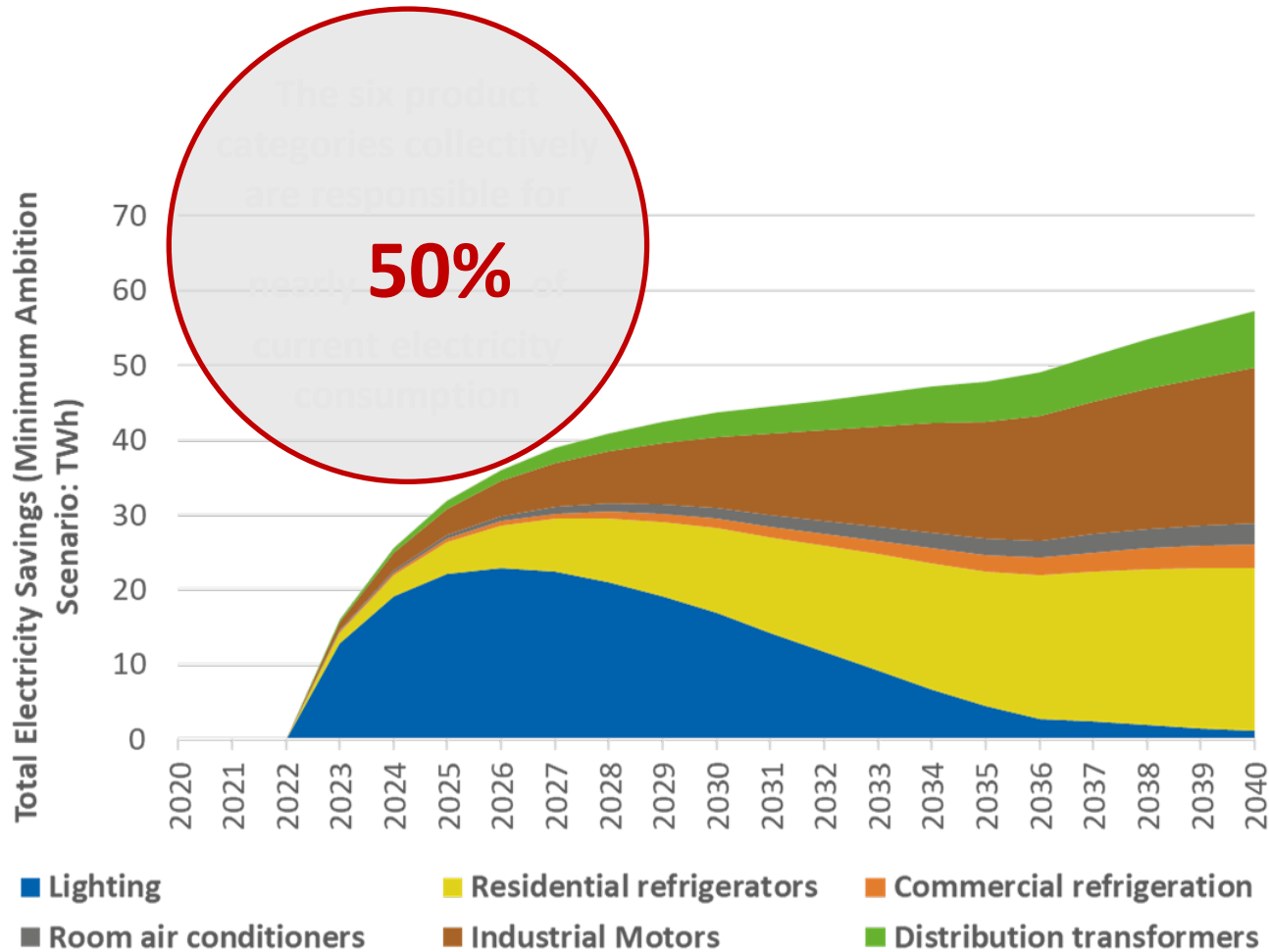
The savings potential in each scenario assumes Minimum Energy Performance Standards (MEPS) are introduced in 2022 in two different levels of ambition (Minimum and High) as shown in the 'Typical Product Assumptions' table above.

Further details of the modelling approach and assumptions are available on the U4E website. For more information contact: unep-u4e@un.org

\* Available in English for all 156 developing and emerging economies. French and Spanish translations are available for select countries



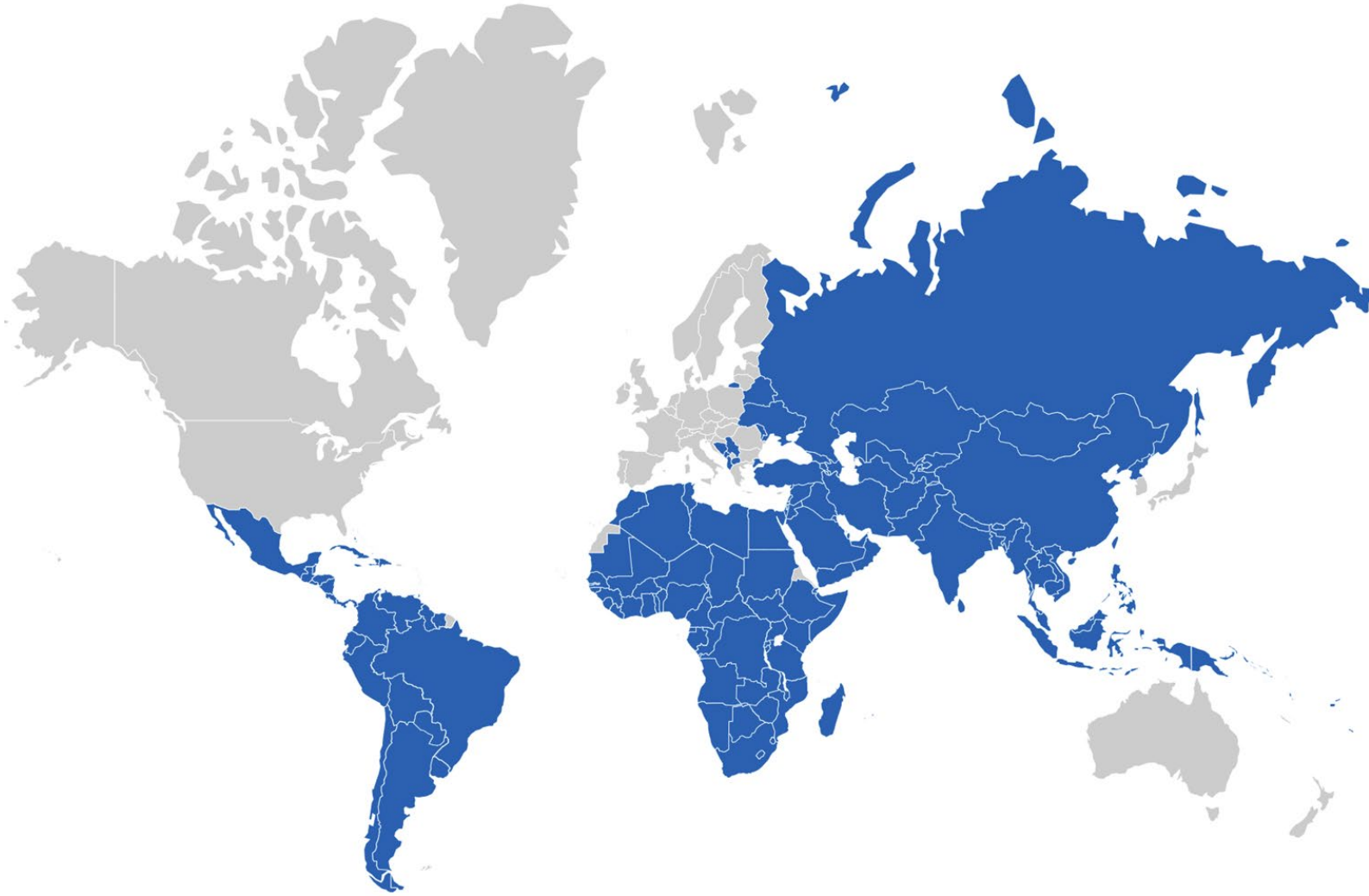
# Saving Opportunities in Central Asia and Eastern Europe from Energy-Efficient Products (4/5)



Savings in 2040 with the Minimum Ambition Scenario	TWh	MtCO2e
Lighting	1	1
Residential refrigerators	22	13
Commercial refrigeration	3	2
Room air conditioners (RACs)	3	2
Industrial motors	21	12
Distribution transformers	8	4
<b>Total</b>	<b>57</b>	<b>33</b>

\*Savings of all six products with Minimum Ambition Scenario in 2040

# U4E Country Savings Assessment- Updated July 2022 (5/5)



- 156 developing countries and emerging economies have been assessed under the U4E Country Saving Assessments
- Explore for each country on: <https://united4efficiency.org/countries/country-assessments/>



# Intervention 2: Sustainable and efficient cooling

- Cooling accounts for 10% of global electricity consumption [1]
- 7% of the GHG emissions are from cooling and expected to double by 2050 [2]
- Cooling energy use expected to triple by 2050 [3]
- Sustainable and efficient cooling solution can reduce this demand

[1] Future of Cooling, IEA

[2] Clean Cooling Collaborative

[3] Future of Cooling, IEA





# Sustainable cooling framework (1/4)

The **2016 Kigali Amendment** to the **Montreal Protocol** encourages sustainable cooling by progressively reducing the reliance on high-GWP Hydrofluorocarbons (HFCs) and offers opportunities for energy efficiency gains.

1. **Overall international framework: Kigali Amendment** - Ten countries in the region have committed to a phase-down of the HFC consumption and production, as 137 countries have done so worldwide.
2. **Practical example: Sustainable technology transition in Moldova** - The financial support provided to the private sector (cooling equipment in supermarkets) by the Multilateral Fund helped introduce energy efficient equipment that work on natural refrigerants such as carbon dioxide. The gains in energy efficiency reached the very high level of 40% through this project.
3. **All countries** in the region **eligible** to receive financial support to ensure compliance with the Montreal Protocol, through either the Multilateral Fund of the Global Environment Facility.



# National Cooling Plans – ECIS (2/4)

**National Cooling Action Plans (NCAPs):** a global policy best practice to address the cross-cutting nature of cooling, to bring stakeholders from government, industry and academia to the table, discuss needs and possible solutions, and translate this into a document that provides a roadmap for action. Currently, over 30 NCAPs are at various stages of development.

Objective: Proposes an overarching comprehensive approach to cooling, from direct to indirect GHG emissions.

Allow to identify interventions and projects with highest potential impact at national level.

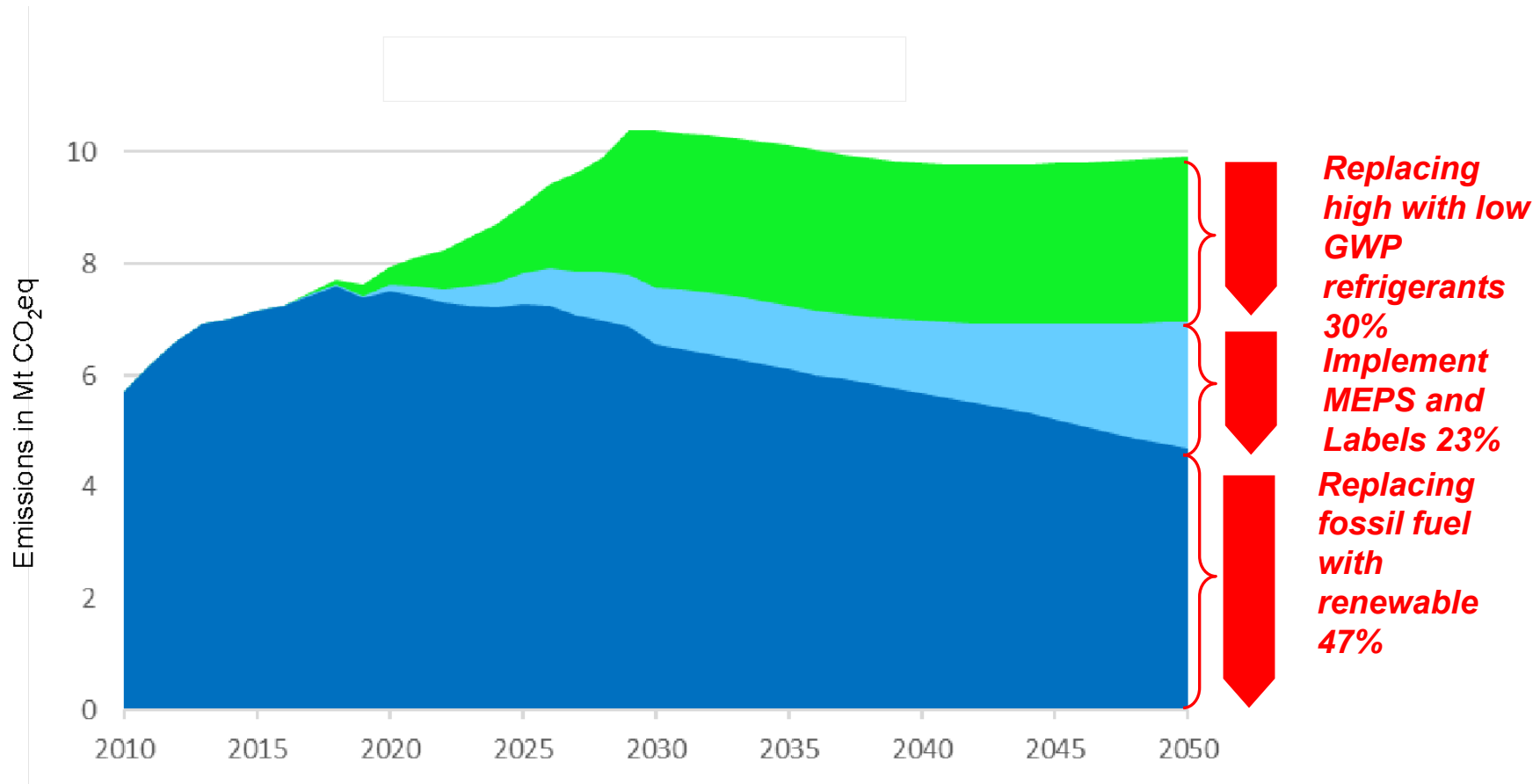
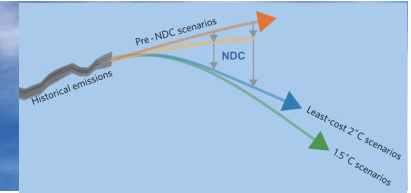
Results can be integrated in **Nationally Determined Contributions (NDCs)**

**Sectors covered** (for example): unitary air conditioning, chiller, mobile air conditioning, domestic, commercial and transport refrigeration.

No NCAP completed yet in ECIS region

2 NCAP preparation are ongoing in 2022 with support of UNDP: in **Kazakhstan** and **Uzbekistan**.

# 3/4 - Example of Lebanon: Impact of energy efficiency and low GWP





# Useful tools for sustainable cooling (4/4)



1. [Cool calculator](#) - This Cool Calculator, developed by Cool Coalition is a 2050 scenario tool that allows stakeholders to run simple but open calculations on key aspects of cooling decarbonisation, empowering them to identify a set of solutions that works best for particular regions and/or sectors.
2. [MEPSy](#) - MEPSy is a policy tool developed by CLASP to determine the impact of appliance performance standards (like air conditioners) to determine national side metrics like reduced energy usage, emissions mitigated, and consumer side metrics like payback period and life cycle cost savings.
3. [Factsheets and final reports for demonstration projects](#) on low-global-warming-potential alternatives to HCFC technologies on the web site of the Multilateral Fund for the implementation of the Montreal Protocol and [Sustainable Cooling solutions](#) from the Clean Cooling Collaborative

# Intervention 3– Fossil fuel subsidies (1/3)

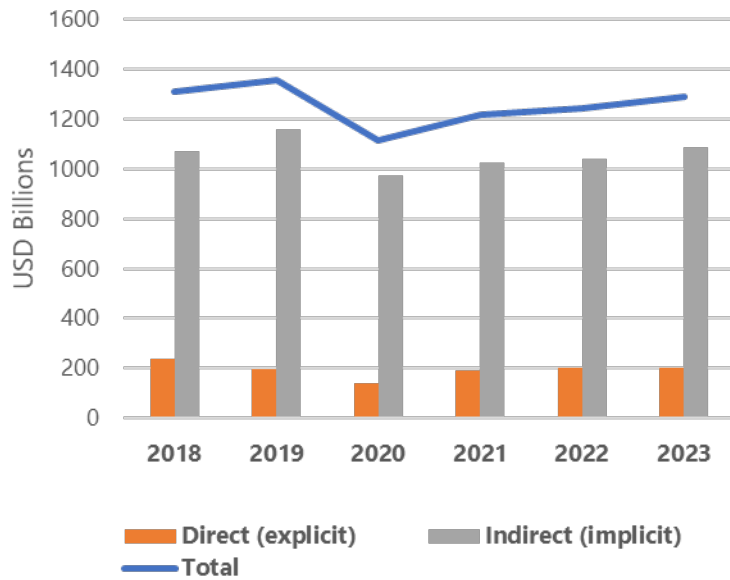


- **Globally colossal amounts are spent on fuel subsidies**
- According to IMF: Overall FFS globally amounted to USD 5.9 trillion in 2020 (or 6.8 percent of global GDP) and are expected to rise to 7.4 percent of GDP by 2025.
- Less than 10 percent of fossil fuel subsidies globally reflect lack of cost recovery (i.e. prices set below supply costs or direct subsidies) while over 90 percent reflect vast negative externalities stemming from excessive consumption of fossil fuels spurred by subsidies (i.e. indirect subsidies).
- In the ECA region fossil fuel subsidies amounted to USD 1.1 trillion in 2020. Expected to have increased to USD 1.2 trillion in 2021 but below pre-pandemic level.
- **However, FFS is expected to have increased considerably in 2022 owing to the global energy crisis.**



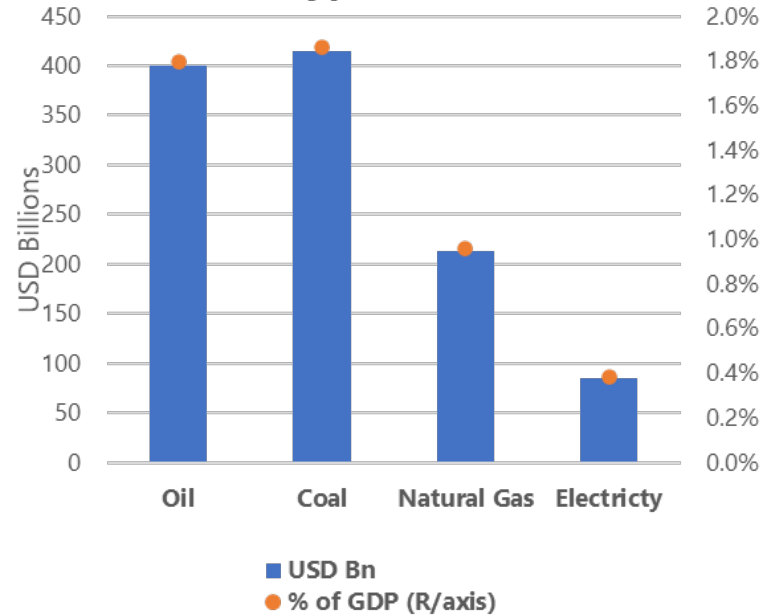
# FFS-Global and Regional context (2/3)

ECA Subsidies 2018-23



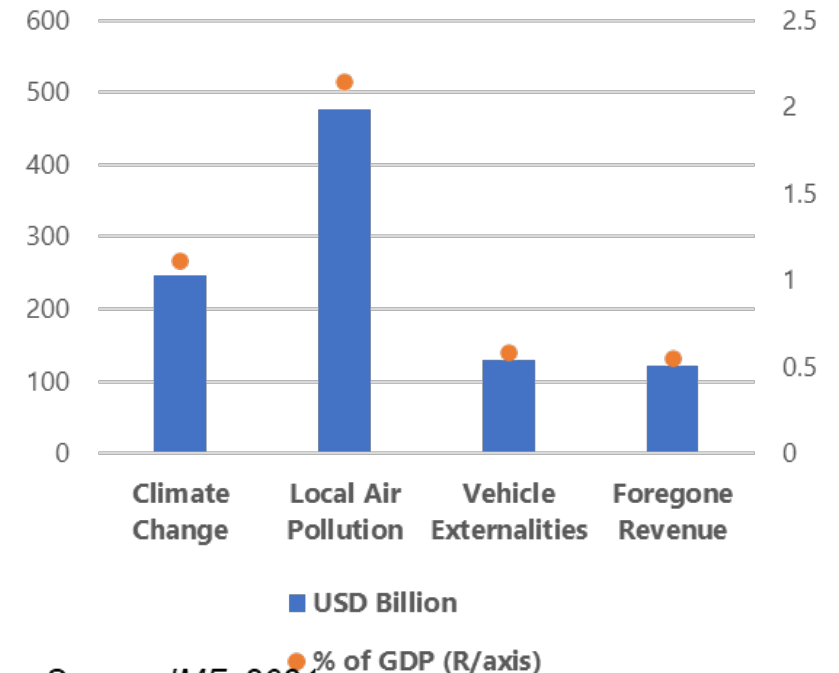
IMF, 2021 (Projections from 2021 does not include effects of global energy crisis)

ECA total subsidies by energy type 2020



Source: IMF, 2021

ECA Implicit Subsidies 2020



Source: IMF, 2021



# FFS in face of the energy crisis (3/3)

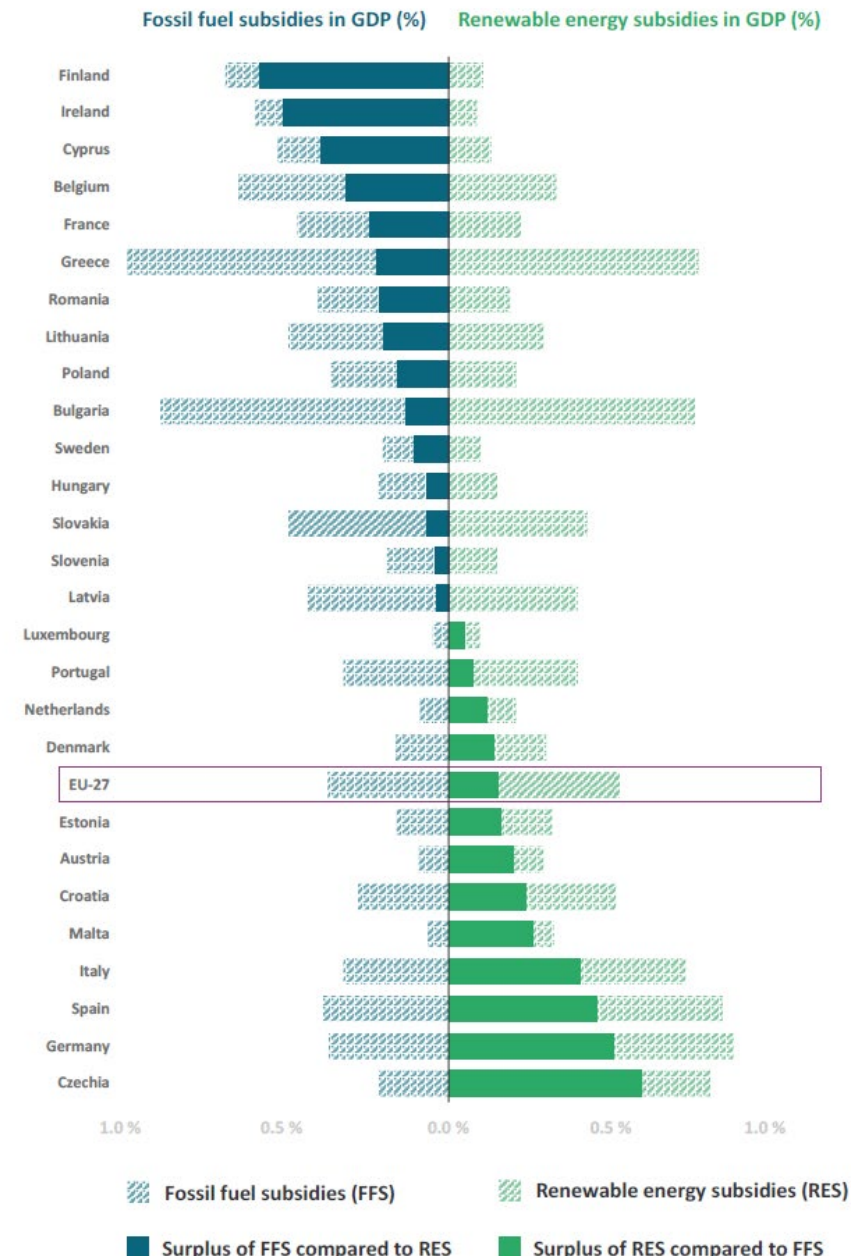
- Will contribute to **growing fiscal and external pressures**

Even among **stronger economies**, blanket subsidies incur **significant opportunity cost**: money that could be better used for strengthening social protection, provide impactful economic stimulus and countering climate change.

- Would stand to delay net-zero transition and **commitments under Paris Agreement**.
- Developed country subsidies would **dent fiscal space that would have otherwise supported ODA** –very much needed by developing countries facing considerable adversities.

# Subsidies to renewable energy

- EU subsidies for renewable energy (RES) has increased nearly four-fold from 2008.
- The growth in renewable energy subsidies has contributed to the increase in the share of renewable energy in the EU energy mix, rising from 12.6 % in 2008 to 19.7 % in 2019.
- In general, throughout EU, RES exceeds FFS. However, in several states the opposite is witnessed: FFS exceeds RES



Source: ECA 2021; European Court of Auditors 2022

Source: ECA based on Trinomics, *Study on Energy costs, taxes and the impact of government interventions on investments*, October 2020.



## Intervention 4: Carbon pricing (1/3)

- The use of **Carbon Taxes** as an explicit means of controlling emissions and thereby lowering indirect subsidies have grown in the EU. [8 states in 2008  
• currently 14 states]
- However, these carbon taxes vary significantly across nations:
  - Poland lowest at €0.1/Ton CO<sub>2</sub>
  - Sweden highest at €100/Ton CO<sub>2</sub>
- The highest share of emissions captured under the carbon tax regime is in Ireland (49%) whilst the lowest are in Estonia and Spain (3% each)





# Carbon prices (2/3)

- The OECD in May 2021 published its effective carbon rates which serves as valuable benchmark:
  - €30/tonne of CO<sub>2</sub> – a historic low-end of the benchmark. **CO<sub>2</sub> prices below this benchmark do not trigger meaningful abatement.**
  - €60/tonne of CO<sub>2</sub>: a mid-range estimate of carbon costs in 2020 **commensurate with a slow rate of decarbonization.**
  - €120/tonne of CO<sub>2</sub> – an estimate of the carbon price needed in 2030 to **effectively decarbonise by mid-century (2050).**



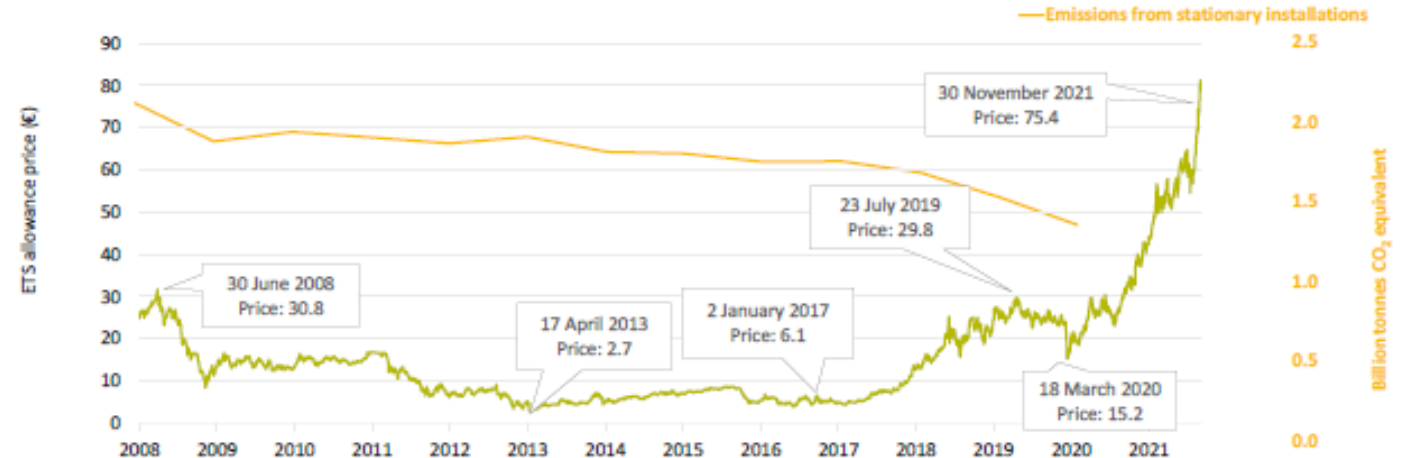
# Carbon pricing (3/3)

- To capture external costs to the environment and the planet
- Polluter pays principle
- National Carbon taxes initiatives are individually designed (different scope & coverages)
- Difference ETS & carbon tax:
  - ETS emission reduction is pre-defined
  - Carbon tax: price is set, but not reduction

## Some price examples in USD/ t CO<sub>2</sub> eq:

EU-ETS: 86,53  
 Kazakhstan – ETS: 1,08  
 Latvia – Carbon tax: 16,58  
 Ukraine – Carbon tax: 1,03  
 Liechtenstein – Carbon tax: 129,86

Source: Worldbank, Carbon Pricing Dashboard  
 Note: Nominal prices on April, 01 2022



Source: ECA, based on Sandbag carbon price viewer and EU ETS data viewer.

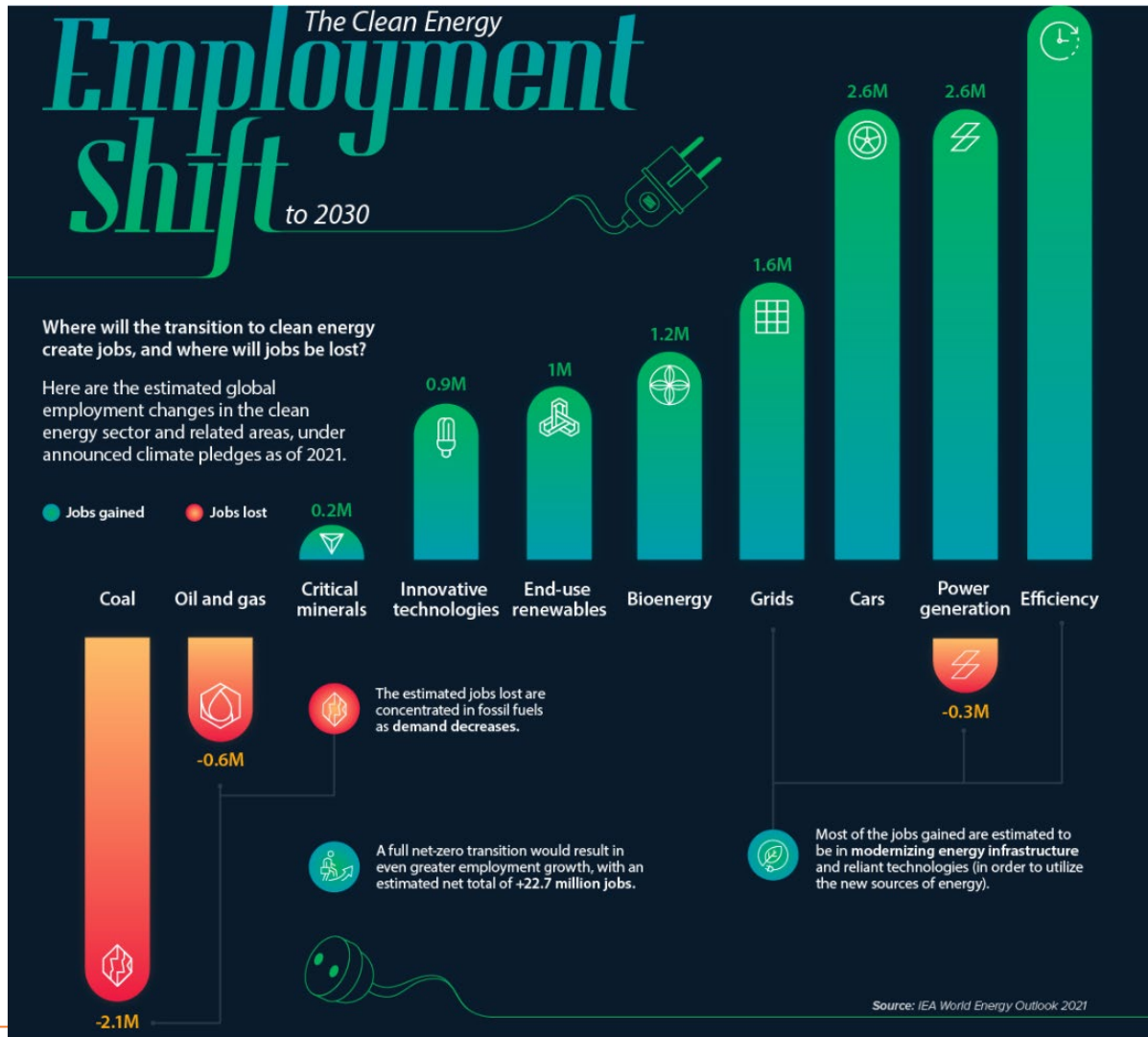


# Benefits of a Green Energy Transition

- Less dependency from fossil fuel imports
  - Less air pollution ☑ better health
  - Green jobs (EU + 884000 jobs, all skills required)
  - Chance of whole-of-society development, respecting gender equity and vulnerable groups
  - Local development options
  - More resilient energy sector
  - A chance for a better future!
-



# Green jobs



- Globally millions of net new jobs
  - IEA: 10.3 Mio by 2030
  - ILO: 18 Mio by 2030
- Mostly in modernising energy infrastructure



# Closing Remarks

Make use of the momentum:

- Energy prices of renewables become competitive
  - Countries want to reduce their dependency on energy imports
  - Citizens care more and more about energy and climate
  - Turn fossil fuel subsidies into green subsidies
-



# Thank you for your attention!

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