ARMENIAN
NATIONAL PLATFORM

EASTERN PARTNERSHIP CIVIL SOCIETY FORUM

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THE SECRETARIAT OF THE EASTERN PARTNERSHIP CIVIL SOCIETY FORUM (EaP CSF)

ARMENIAN NATIONAL PLATFORM

SUPPORT TO ANP WORKING GROUPS PROJECTS

ECOTEAM - ENERGY AND ENVIRONMENTAL CONSLUTING NGO

ARTASHES SARGSYAN

POLICY PAPER

EU-ARMENIA COOPERATION'S NEW OPPORTUNITIES FOR SUSTAINABLE ENERGY DEVELOPMENT IN ARMENIA

2021

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The study is implemented within the CSF Armenian National Platform Secretariat support to the ANP Working Groups' activities.

This study was produced with the financial support of the European Union. Its contents are the sole responsibility of the author(s) and do not necessarily reflect the views of the European Union.

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EASTERN PARTNERSHIP
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LIST OF ACRONYMS

ANP	Armenian National Platform
AMD	Armenian Dram
ANPP	Armenian Nuclear Power Plant
BUR	Biennial Update Report
CC	Combined Cycle
CEPA	Comprehensive and Enhanced Partnership Agreement
CCGT	Combined Cycle Gas Turbine
EaP	Eastern Partnership
EBRD	European Bank for Reconstruction and Development
SCF	Civil Society Forum
EE	Energy Efficiency
ENA	Electric Networks of Armenia CJSC
EU	European Union
GoA	Government of Armenia
GHG	Greenhouse gases
HPP	Hydro Power Plant
LEDS	Low Emission Development Strategy (LEDS)
MTAD RA	Ministry of Territorial Administration and Infrastructure of Armenia
NAP	National Adaptation Plan
NDC	Nationally Determined Contributions
PSRC	Public Services Regulatory Commission
RE	Renewable Energy
RA	Republic of Armenia
SHPP	Small Hydro Power Plant
TPP	Thermal Power Plant
UNFCCC	The United Nations Framework Convention on Climate Change
USAID	U.S. Agency for International Development
VAT	Value Added Tax
WB	World Bank
MJ	Mega joule (10^6J)
MW	Megawatt (10^6W)
PV	Photovoltaic
toe	Tons of oil equivalent

Unit conversion

1 kWh=3.6MJ
TWh = 0.086 Mtoe, 1 t o.e. = 41.87 GJ

Exchange rates used in this paper:
1USD = 480 AMD (as of October, 2021), 1 Euro = 550 AMD (as of October, 2021)

INTRODUCTION

On 02.07.2021, European Commission released **JOINT STAFF WORKING DOCUMENT Recovery, resilience and reform: post 2020 Eastern Partnership priorities** [1]. It covers the time interval from 2021 to 2025 and will be based on 5 pillars: democracy and the rule of law, economic recovery, the environment, the digital transition, and more inclusive societies.

Two important documents were produced by EU before post 2020 Eastern Partnership priorities: "The resulting Joint Communication "Eastern Partnership Policy beyond 2020: Reinforcing Resilience an Eastern Partnership that delivers for all" (March 2020) [2] and Council Conclusions of May 2020 Strengthening resilience have been placed at the corner of new policy framework with five long-term objectives [3].

EaP CSF actively participated in the discussion of priorities. Among documents produced it prepared Structured consultation on the Eastern Partnership beyond 2020 EaP CSF (October 2019). Energy cooperation, green economy, transport were among issues prioritized in the document.

JSWD presents an economic and investment plan with 10 targets and country-specific flagship initiatives. The changes to the EaP architecture are also indicated.

It is expected that that several platforms like ***the High-Level Energy Efficiency Initiative, the Green for Growth Fund, the Covenant of Mayors and the Eastern Europe Energy Efficiency and Environment Partnership*** will have significant place in attracting investments in energy and climate change areas in partner countries.

1. ENERGY SECTOR IN ARMENIA. OVERVIEW.

Currently, power system of Armenia includes the following operating plants with a total installed capacity of 2878.7 MW as of July 1, 2020 [4]

- Armenian Nuclear Power Plant (ANPP) - 407.5 MW
- Hrazdan Thermal Power Plant (TPP)- 410 MW
- Hrazdan Unit 5 - 467 MW

- Yerevan CCGT -1 (Combined Cycle Gas Turbines) - 228.6 MW
- Vorotan Cascade of Hydroelectric Power Plants - 404.2 MW
- Sevan-Hrazdan Cascade of Hydroelectric Power Plants - 561.4 MW
- Renewable small power plants (under 30 MW) about 400 MW (about 380 MW are small HPP).

Main priorities of the Energy Sector development are:

1. Maximum use of renewable energy potential
2. Possible realization of energy- efficiency potential (transport, industry, multi-apartment buildings, public sector budgeting, fuel system, etc.
3. Life extension of the ANPP Unit 2
4. Regional cooperation- North-South Road Corridor construction program, Armenia-Iran and Armenia-Georgia power transmission lines
5. Gradual liberalization of the electricity market. Armenia has also commenced to transit to a new liberalized model in the coming years, will have precise milestones towards the full liberalization given the creation process of EAEU Common energy market and the EU Comprehensive and Enhanced Partnership Agreement.
6. Digital energy, science-based energy.

According to The Energy Sector Development Strategic Program to 2040 (GoA decision in 2021) of the Republic of Armenia, government aims to increase the share of solar power generation at least to 15% or 1.8 billion kWh by 2030 [4]. For that purpose, solar power plants with total installed capacity of 1000 MW including autonomous plants will be constructed.

Development of new Action Plan for Renewable Energy (2020-2030) is underway. Tender was announced by UNDP in Nov. 2019 and R2E2 Foundation was awarded with grant and the program is currently under development to be completed in 2021. The work started in 2020. Date of program presentation and approval is scheduled by the end of 2021.

Previous the RA Energy Efficiency and Renewable Energy National Program till 2020 was approved by the GoA on January 18, 2007[5]. It is reasonably to mention that there were no financial obligations from government to support this program.

In 2020, total production of electricity in republic was 7723.4 mln. kWh, of which 855.2 mln. kWh was produced by renewable energy sources (small HPPs, solar and wind power stations i.e. around 11.1 percent). Largest share of renewables belongs to small HPPs (832 mln. kWh -97.3%). In last year, solar photovoltaic stations have been developed at growing rates. Insignificant amount of geothermal energy is

used for heating purposes. There is no electricity production from geothermal sources. The only Lusakert biogas plant constructed don't operate for several years. In 2020, totally 4 (four) wind power plants in Armenia produced 1.9 mln. kWh of electrical energy. All data for gross electricity production in Armenia in 2020 were taken from PSRC. In evaluation of share of renewables in Armenia some misunderstanding might be raised since small HPPs with power less than 30MW are accounted to renewables, while in EU all HPPS are accounted to renewables.

The households (both urban and rural) have 100% access to electricity in 2019. This is the responsibility of Electricity Network of Armenia (ENA) - private company. With that a lot of modernization works are required including updating high-voltage electricity lines, digitalization of system etc.

2. JOINT STAFF WORKING DOCUMENT: Recovery, resilience and reform: post 2020 Eastern Partnership priorities. Opportunities for Armenia in energy and climate sectors.

An important part of the document [1] is devoted to sustainable energy (page 21), particularly, to investing in sustainable energy –towards a more energy-efficient, energy-resilient and interconnected EaP region. The buildings account for 40% of energy consumption in the partner countries The plan will mobilize potential investments of up to €3.4 billion in this area with focus on improving energy efficiency standards in buildings (which), and making renovations of public and residential buildings (page 21) more affordable.

One of the top ten targets established in the documents and related to energy consumption and directed at all 6 partner counties is to have "250 000 households that reduce their energy consumption by at least 20% and to create jobs in this sector" (page 10).

The EU will reduce its net greenhouse gas emissions by at least 55% by 2030, compared to 1990 levels, as agreed in the EU Climate Law. On 14 July 2021, the Commission presented proposals to deliver these targets and make the European Green Deal a reality.

In accordance with point 2.3.4 of JSWD, the EU will promote and support the transition to clean energy systems in the partner countries in line with the European Green Deal and the relevant Council Conclusions. It will further promote energy efficiency in line with the EU's Renovation Wave and apply the 'energy efficiency first' principle across all sectors regarding policy, investment and planning decisions. This will require robust legislative frameworks and long-term renovation strategies.

At least 5 000 buildings will be renovated resulting in a reduction of energy consumption by at least 40%. EU support will focus on:

- improving energy efficiency and introducing energy efficiency standards in buildings;

- making large-scale comprehensive renovations of public and residential buildings more affordable; and
- capacity building to develop economies of scale (energy auditors and other specialist professions, construction products, financing instruments in the banking sector).

In addition, the partner countries (together with the EU and its Member States) will:

- improve the functioning of energy markets for the benefit of producers and consumers;
- strengthen capacity building for clean and sustainable regional energy infrastructure development, including cross-border connectivity and contribute to mobilizing investments and financing in line with the European Green Deal and sustainability criteria;
- strengthen national energy legislative and regulatory frameworks in line with the Energy Community treaty, where applicable, and relevant bilateral commitments, and EU standards;
- realize the full potential of renewable energy, promoting innovation of energies, cut costs for consumers, protect citizen's health and create green sustainable and decent local jobs, inter alia by promoting energy sector reforms and addressing barriers to investments; investigate options for renewable hydrogen generation and use and for environmentally sound investments in hydro, solar, wind and geothermal sources; reduce, where applicable methane emissions throughout the whole energy value chain; and
- ensure the highest level of nuclear safety and radiation protection in countries operating nuclear installations and full transparency with their own citizens and neighboring countries.

On 22 April, 2021, the government of Armenia approved the country's updated 2021-2030 Nationally Determined Contributions (NDC) under the Paris Agreement [6]. The EU-funded EU4Climate project, implemented by the United Nations Development Programme, has supported the Ministry of Environment in developing the document. The NDC sets Armenia the 2030 target of reducing greenhouse gas (GHG) emissions by 40% compared with 1990 levels.

The Intended Nationally Determined Contributions (INDC) submitted in 2015, became the country's first NDC for the period 2015-2050, after the ratification of Paris Agreement in 2017. With the updated document, Armenia aligns its NDC implementation periods with most countries, including the EU's member states, adopting a ten-year NDC implementation timeframe of 2021-2030. Its key component is the enhanced transparency and accountability framework for tracking the progress on implementation of the country's commitments under the Paris Agreement.

3. INTERNATIONAL COOPERATION

In JSWD, it is expected that that several platforms like *the High-Level Energy Efficiency Initiative, the Green for Growth Fund, the Covenant of Mayors and the Eastern Europe Energy Efficiency and Environment Partnership* will have significant place in attracting investments in energy and climate change areas in partner countries. In addition, several international funds and agency have already supported and will support sustainable energy development in Armenia, among R2E2 Fund [11], UNDP/GEF Small Grants Program, UNIDO/Armenia, US AID/Armenia, UNDP Armenia Energy Efficiency Projects. Climate Change Information Center [14] funded by UNDP play significant role ia awareness raising on sustainamle energy projects. For purposes of this study below are considered the paltforms directly indicated in JSWD and their activities is brought in short following the logic of studies of similar formats.

3.1 High-Level Energy Efficiency Initiative in Armenia

High-Level Energy Efficiency Initiative in Armenia **(2019)** is a joint initiative of the European Commission and International Financing Institutions aims at bringing energy efficiency reforms and investments to scale by actively collaborating with the Government and relevant stakeholders of selected countries. The round table was attended by high-level representatives of the European Commission, the European Investment Bank, the World Bank and other IFIs. The EIB and WB consultancy team presented the findings and recommendations of the Gap Analysis for Buildings Energy Efficiency, to discuss opportunities to develop the Armenian energy efficiency in the buildings sector, as well as how support to energy efficiency initiatives could be strengthened and scaled up both in public and multi-apartment residential buildings. https://www.saegepr.com

3.2 The Green for Growth Fund (GGF)

The Green for Growth Fund (GGF) [7] is a public-private partnership, established in 2009. The activities of The Green for Growth Fund (GGF) supported by the European Commission, aimed at development energy efficiency and renewable energy in neighboring countries and cover Armenia, Azerbaijan, Georgia, Moldova, and Ukraine. GGF provides refinancing to financial institutions to enlarge their participation in the energy efficiency and renewable energy sectors and makes direct investments.

The extension of the GGF to the Eastern Neighbourhood will help the region to meet its targets for cleaner energy, to reduce dependence on imported sources, to support energy savings, to improve competitiveness and household costs.

During the coronavirus (COVID-19) pandemic in 2020, the EU increased the initial EU contribution of €10.2 million by €32.5 million. The top-up will be used to safeguard and continue the green transition of all six Eastern Neighbourhood countries. In particular, it will help to provide financing flexibility at

MSME/household level through additional or adjusted loans related to green investment, to provide partner institutions with time and liquidity (incl. local currency financing), and to strengthen risk capital at fund level to continue lending while facing increased risk

3.3 Eastern Europe Energy Efficiency and Environment Partnership (E5P)

Eastern Europe Energy Efficiency and Environment Partnership (E5P) [8] is a multi-donor, multi-agency fund initiated during the Swedish Presidency of the European Union in 2009. It aims to support high impact energy efficiency and environmental projects in the Eastern Partnership countries. The E5P fund of over €243 million merges financial contributions from the European Union and a group of over 24 countries. The European Union is the largest contributor having pledged €94.4 million, while Sweden is the largest bilateral contributor with €66 million. The E5P grant will help Armenia improve energy efficiency, contributing to energy security and economic competitiveness, while having a positive impact on the environment. The European Union is the largest contributor to the E5P Fund in Armenia, with €10 million pledged. Other contributors include Sweden (€7 million), Germany (€4 million), Norway, Denmark, the Czech Republic, Poland, Finland, Slovakia, Lithuania and the Taiwan Business EBRD TA Fund. Armenia is also an E5P donor with a contribution of €1 million.

3.4 The European Investment Bank (EIB) in the Eastern Neighbourhood countries

The EIB is the long-term lending institution of the European Union owned by its Member States. It makes long-term finance available for sound investment in order to contribute towards EU policy goals.

The EIB has worked with Armenia since 2010, providing financing for a wide range of projects, from infrastructure and small businesses to water supply services and wastewater treatment as well as cross-border connections to build safer and more sustainable roads. The EIB also supports small businesses and promotes the development of the private sector, as well as creating and securing employment and income in rural areas (focusing notably on agro-industry and sustainable tourism), interventions coupled with technical assistance. In close partnership with the Municipality of Yerevan, the Bank is improving the energy efficiency of kindergartens and other buildings. The installation of renewable energy systems, earthquake reinforcement and disabled access infrastructure will provide jobs and help decrease CO2 emissions. In response to the COVID-19 pandemic, the EIB is engaged in finding solutions for the EaP countries and working towards their economic recovery.

3.5 The Yerevan Energy Efficiency Project

The Yerevan Energy Efficiency Project [9] is implemented by the European Investment Bank (EIB) and aims to address the refurbishment of public buildings (kindergartens) and the use of renewable energy sources. 90 kindergartens in the Armenian capital will be refurbished to improve their energy efficiency, seismic stability and sanitary conditions in the context of the COVID-19 situation. It is part of the Yerevan

Energy Efficiency Project worth €15 million. It includes EIB loan of €7 million, grant of €5 million from the E5P, a technical assistance grant of €1 million from the Green Climate Fund from the United Nations Development Programme (UNDP) and Yerevan Municipality's own funds of €2 million.
According to assessments, Yerevan Energy Efficiency Project will result in primary energy savings of 12 154 MWh a year and reduce CO2 emissions by 2 412 tons a year.

3.6 The European Bank for Reconstruction and Development (EBRD)

The European Bank for Reconstruction and Development (EBRD) is providing a loan of US$ 70 million to Electric Networks of Armenia (ENA), the country's sole electricity distribution company and long-standing client of the Bank. The funding will support the large-scale modernization of the power distribution network in the country.
The loan aims to strengthen ENA's distribution infrastructure, with a focus on the regions as well as the country's two largest cities, Yerevan and Gyumri, both of which are part of the EBRD Green Cities programme.
ENA will address specific environmental priorities identified in the cities' Green City Action Plans (GCAPs), such as the reduction of greenhouse gas emissions and the integration of renewables into the power system. The financing will support Armenia's digital transition through the large-scale implementation of automatic control and smart metering systems, enhancing the power network's reliability and flexibility and significantly improving systems performance.
https://euneighbourseast.eu/news-and-stories/latest-news/ebrd-support-for-electric-networks-of-armenia/

3.7 The Covenant of Mayors

The Covenant of Mayors was launched in 2008 in Europe to gather local governments committed to achieving and exceeding the EU climate and energy targets. The initiative now gathers 9,000+ local and regional authorities across 57 countries [10,13].

In October 2015, both CoM (Covenant of Mayors) and Mayors Adapt initiatives officially merged forming a new initiative called Covenant of Mayors for Climate & Energy - the goals and direction of which were defined with cities through a consultation process - is both more ambitious and broad-ranging.

Hence, commitments of Signatories may differ depending on the period of adhesion to CoM.
Covenant of Mayors (CoM2020): Signatories who joined CoM in 2008-2015, made the voluntary commitment to achieve at least 20% CO2 emission reduction.
Mayors Adapt: Local authorities who signed up to Mayors Adapt in 2014-2016, made the political commitments to take action to adapt to climate change.
Covenant of Mayors for Climate & Energy (CoM2030): Signatories that join CoM after October 2015 1 commit to reduce their CO2 emissions (and possibly other greenhouse gas) by at least 40%2, increase their

resilience to the impacts of climate change and provide secured access to sustainable and affordable energy by 2030. Three last projects reasonably to be mentioned within Covenant of Mayors activities in Armenia are as follows.

Access to Renewable and Efficient Energy in Municipalities of Vayk and Spitak (AREEM) Project

The project was aimed to support the municipalities through development of efficient models of energy saving and RES in residential and public buildings.

Project data: Duration: December 2014 - December 2019; Budget: 1,687,539 Euro; Project Donor: EU (80%); Project Participants: Spitak and Vayk municipalities (20%); Implementer: Habitat for Humanity Armenia Foundation.

Activities included energy audits, replacement of entrance doors, EE modernization of lighting system with LED luminaries, retrofitting works (thermal insulation of external walls, ceilings and floors), solar PV system installed in Spitak with a total capacity of 43.5 kW, four solar PV systems with an aggregate power capacity of 42.9 kW in Vayk.

EU for Yerevan Solar Community Project

The project is aimed to reduce the energy consumption and associated emissions of GHGs through supporting application of EE measures and RES in multi apartment buildings of Yerevan.

Project data: Duration: March 2018 – March 2020 (will be extended); Budget: 1,250,000 Euro; Donor: EU (80%); Participants: Yerevan Municipality (20%); Implementer: Yerevan Municipality

The objective of the project to support the multi-apartment building management bodies in management of the energy use through introduction of EE measures and installation of roof-top solar PV systems to cover the energy demand for common areas such as elevators, indoor illumination of entrances and staircases as well as outdoor illumination of yard areas. The measures are to be introduced in 90 MABs in Yerevan and will help to cover 100% of demand of the mentioned facilities.

Along with this it is planned to install 360 LED outdoor luminaries, 1620 indoor LED luminaries, distribute 1565 LED lamps to low-income families and introduce electronic energy management software tool.

It is assumed that the project will result in an annual emission reduction of 844 tCO2/a. Yerevan officially joined the European initiative ‘Covenant of Mayors’ in September 2014 and has committed itself to enhance energy efficiency and grow the use of renewable sources of energy in its territory.

Fig. 1. EU4Yerevan-Solar Community Project. Solar PV system installed on the roof of multi-story residential apartment building. https://com-dep.eu/eu4yerevan-solar-community-project-promotes-renewable-energy-energy-efficiency-retrofits-in-multi-apartment-buildings/

European Union for Armenia's Sustainable Energy (EU4SEPA) Project

The project is aimed at development of a viable model for a community-lead RE generation and sustainable energy transformation in Artik and Aparan.

Project data: Duration: February 2018 – February 2021; Budget: 899.975 Euro; Donor: EU (80%); Participants: Artik and Aparan municipalities (20%); Implementer: Energy Saving Foundation.

Activities include construction in Artik 0.6 MW solar PV system for feeding into public grids at green tariffs, coupled with private sector participation and implementation of massive outreach campaign and capacity building; integration of 25 kW solar PV plant in Aparan for net metering connection with the grid for community institutions' own needs; Capacity building of the municipal officials, community members, business sector and residents to promote behavioral changes in EE and RE, better energy management and publicity of the achieved results through trainings, seminars, sustainable energy days/weeks;

CONCLUSIONS

- The existing platforms such as the High-Level Energy Efficiency Initiative, the Green for Growth Fund, the Covenant of Mayors and the Eastern Europe Energy Efficiency and Environment Partnership prove their large potential on the way to Just Transition, at the same time there exist unexploited potential to accelerate such transition. Large private investments should take more share to reach ambiguous targets. Assessments of different opportunities to transform to greener economies requires significant efforts and capacities (human, technological, financial).

- Priorities of EU in area of energy saving/efficiency are improving energy efficiency and introducing energy efficiency standards in buildings; renovations of public and residential buildings more affordable; and capacity building to develop economies of scale (energy auditors and other specialist professions, construction products, financing instruments in the banking sector). It also means that new jobs will be created for energy auditors, financial specialists in area connected with energy saving, specialists in renovations. Education of energy auditors can be implemented through specialized NGOs. Also citizens should be educated to have basic skills on how to measure energy consumption of different appliances at home, residential buildings. This direction is enough good related with STEM (Science, Technology, Engineering and Mathematics) so young persons can be involved in these activities.

- EU support large scale development of renewable energy, promoting innovation of energies, cut costs for consumers, protect citizen's health and create green sustainable and decent local jobs, inter alia by promoting energy sector reforms and addressing barriers to investments; investigate options for renewable hydrogen generation and use and for environmentally sound investments in hydro, solar, wind and geothermal sources; reduce, where applicable methane emissions throughout the whole energy value chain.

- As the EU will ask to provide and ensure nuclear safety and radiation protection in countries with operating nuclear stations and transparency with their own citizens and neighboring countries then monitoring activities and awareness raising can be implemented also with involvement of NGOs.

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ATTACHMENT 1

LOCAL CONTACT POINTS FOR EU4CLIMATE, EU4ENERGY, AND EU4 ENVIRONMENT IN ARMENIA

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https://eu4climate.eu/

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https://www.eu4environment.org/where-we-work/armenia/

ATTACHMENT 2

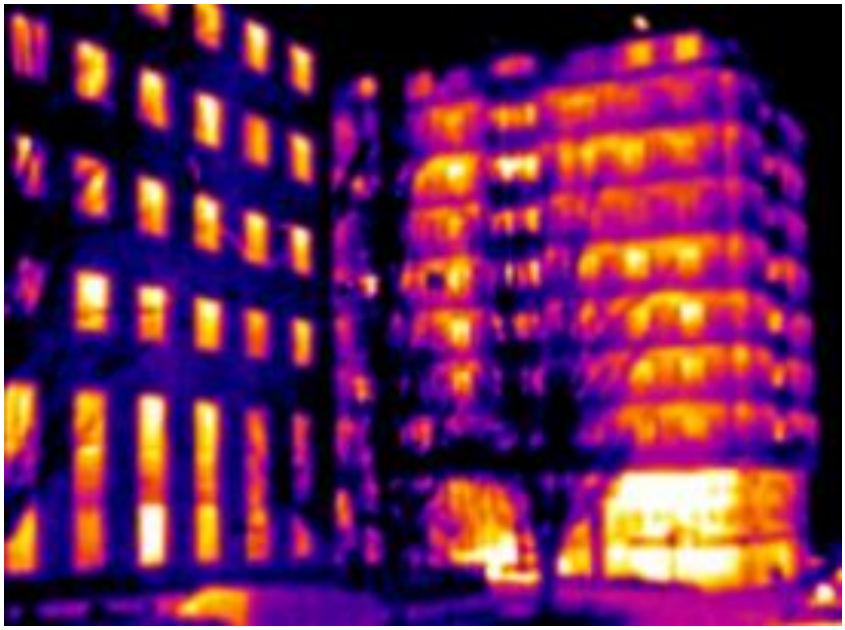

Fig. 2. Energy audit of building in Armenia (made with IR camera) to find heat leakages from: De-Risking and Scaling-up Investment in Energy Efficient Building Retrofits project https://unece.org/DAM/hlm/prgm/hmm/sustainable_housing/armenia/armenia_2017/10_Jalalayan.pdf

Fig. 3. 75% building were built during the Soviet er (1951-1990) and lack proper insulation (Energy-efficient buildings in Armenia: a roadmap, IEA, EU4Energy)

ATTACHMENT 3

- Fig.4. The EU will reduce its net greenhouse gases emissions by at least 55% by 2030, compared to 1990 level, as agreed in the EU Climate law. July 2021 (Source: European Union, 2021., https://www.cleanenergywire.org/factsheets/covering-eus-fit-55-package-climate-and-energy-laws)