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GREEN INVESTMENTS AND THEIR INFLUENCE ON GREEN GROWTH IN RA: INTEGRATING ECONOMIC GROWTH WITH SUSTAINABILITY

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Abstract: The importance of green investments in the developing economies is in the potential of reducing the emissions and creating alternative funds to effectively contribute to economic growth and sustainable development. The main objective of this research is to explore the macroeconomic implications of green investment in the transformation to a green economy, while defining main sectoral priorities for investment allocation and underlining the short- and long-term macroeconomic effects of the "green" investment on the basis of which we can build possible scenarios for green transformation in the RA. For this purpose, we have examined the features of the new taxonomy of investments proposed in the "LowGrow SFC" model, which was developed based on the Canadian economy. We propose to classify green investments in Armenia as "productive" or "non-productive", "additional" or "non-additional". Within the framework of the above-mentioned logic of presenting investments according to their macroeconomic impacts, the main directions of the RA economy that can contribute to the growth of the green economy have been highlighted. In the article it is suggested that there are two possible scenarios for Armenia's green transformation, each of which takes into account different levels of investment, policy actions, and technological deployment. Which scenario is most effective for Armenia depends on the ability of the Armenian economy to attract green investments.

Keywords: ***green investment, sustainability, green growth,*** *productive or non-productive investments, additional and non-additional investments*

Introduction

The "Green Wave" has covered almost the entire economic and financial system. The global movement towards sustainability and eco-growth is rapidly transforming the investment landscape. As the global economy continues its transition to sustainability, green investments are becoming a critical driver of economic growth, social impact, and environmental protection. Investors and businesses that align their strategies with these global sustainability trends will not only contribute to addressing climate change and environmental degradation but will also position themselves to thrive in an increasingly green-focused economy.

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In every nation's "Green Growth Strategy", green investment plays a vital role in sustainable development. Transitioning to a circular economy, where the waste is minimized, and the resources are maximized, is crucial for a more sustainable future. Investors may make well-informed decisions that not only benefit their portfolios but also work towards a greener future. Within the framework of the socio-economic transition of RA from a phase of rapid and poor-quality economic growth to one of high-quality development, it becomes crucial to focus on advancing the green economy to sustain economic progress. This research identifies some factors influencing green investments' allocation, investigates challenges and solutions' directions for promoting green finance in RA.

Research methodology

For the implementation of the research, our analysis has been done on the basis of legislative acts in RA and the data from the websites of various sectoral authorized bodies, including statistics, sectoral reports available on them. Within the framework of the research the general scientific methods have been applied such as comparison and historical analysis, induction and deduction synthesis, also qualitative and quantitative assessment methods, similarity, dynamic and structural observations approaches were used.

Legislative framework and Government programs on green investments in Armenia (2004-2024). Over the past quarter century, Armenia has made significant progress in reforming its legislative framework and government programs to ensure the transition to a green economy and promote green investments, paying special attention to the issues of financial stability and building an energy-efficient economy, while also emphasizing the issues of environmental protection and climate change mitigation.

The overview of the main legislative and policy developments in the framework and government initiatives supporting green investments.in Armenia have shown, that almost all the governments of the RA, since 2000, have tried to a greater or lesser extent to show some initiatives towards the formation of a "green economy". According to the analysis of Armenia's governmental programs, the economic category of "sustainable development" was first mentioned in the programs of the RA Government in 2007 (RA Government Program, 2007) and the concept of "green economy" was used for the first time in 2013. In the RA Government programs of 2013 and 2014, the importance of transitioning towards a "green economy" as part of their strategic vision for sustainable development (RA Government Program, 2014, point 2.4.4.) was highlighted. The concept of sustainable development has been addressed within the framework of sectoral programs (RA Government Program (2013), point 3.4.4). The concept of the "green economy", with a focus on sustainable development, for the first time since 2013, has not been included in the 2018 RA Government Program, and only in the 2019 RA Government Program were these two concepts combined: "green economy" and "sustainable development", as a single system, mentioning the need to develop and implement a separate policy to ensure them (RA Government Program, 2019 point 4.8). Finally, in 2021, the Government of Armenia renewed its commitment to green recovery and growth by introducing green economy and sustainable development policy priorities in its new five-year (2021 – 2026) program (RA Government Program 2021-2026, point 2.2). The primary goal of the Government of the RA in forming a "Green Economy" is to ensure the readiness of the economy for a new, low-carbon energy reality, and the second goal is to create the prerequisites for the longer preservation of natural resources in the economic cycle. The legislative

framework contributing to the transition to a "green economy" in Armenia is not only supported by national legislation and policies, strategies, action plans and roadmaps, but also by its participation in global, regional, and bilateral agreements. But none of them contains provisions directly attributable to the process of forming a "green economy", they are predominantly attributable to environmental protection, which, naturally, is one of the pillars of the "green economy". In other words, we are in a situation where the RA is a member of a number of international agreements, has ratified a number of legal acts which are related to the formation of a "green economy", but doesn't completely close the field of action, moreover, they are not coordinated around a single common idea and policy, the development and implementation of which should be the responsibility of the Government of the RA.

For about a decade, the strategy and policy of forming and gradually implementing a "Green economy" have remained on the agenda. The RA has already developed a document (draft) "Strategy for Green and Sustainable Economic Development", which is another important step on the path to ensuring sustainable macroeconomic development. The main tools of the strategy, in addition to reforms in the legislative and regulatory framework and a number of other important directions, also include the promotion of investments in green infrastructure, such as sustainable construction, energy, transport, etc. One of the targets for implementing the strategy is to increase the volume of green investments, in particular in the fields of green energy, transport and ecotourism, which will stimulate the creation of new and green jobs. In outlining the action plan, the RA policy envisages implementing a sustainable finance strategy policy, which will be based on a green taxonomy, will set appropriate criteria for green and sustainable investments, encouraging banks and financial institutions to invest in green projects, and in the long term, will create a basis for offering tax incentives for green investments ("Green and sustainable economic development strategy" draft - decision of the government of the Republic of Armenia).

So, the main task of the policy involves three key elements, which must be carefully aligned:

- To choose the right and expedient investment target,
- To select the appropriate financing option for maintaining financial stability,
- To assess the expected macroeconomic impact.

The EU's "Green Taxonomy" on Sustainable Finance (Regulation 2020/852) clarifies the scope and meaning of the green investment. According to this taxonomy "environmentally sustainable investment" (understood here as green investment): 1) must make a substantial contribution to one of six environmental objectives (climate change mitigation; climate change adaptation; sustainable use and protection of water and marine resources; transition to a circular economy; pollution prevention and control; and protection and restoration of biodiversity and ecosystems), 2) does no significant harm to the other five, and 3) must meet minimum safeguards such as the UN guiding principles on business and human rights (Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment). Therefore, we can say, that the EU taxonomy defines what the meaning of green investment is.

We have analyzed the "**LowGrow SFC model"** (which can be seen as a low-growth scenario) that was developed based on the Canadian economy (Jackson T. and Peter A. Victor, 2020), and refers to a type of economic modeling approach that simulates low-growth scenarios in an economy through a Stock-Flow Consistent (SFC) framework. This model is typically used to analyze how economic variables such as income, **investment**, consumption, and savings interact under different growth conditions and how they

affect overall economic stability. We have examined the features of the new taxonomy of investments proposed in the model, and the possibilities of its application in the RA.

For defining the main sectoral priorities for investment allocation and underlining the short- and long-term macroeconomic implications of the "green" investment, it should be mentioned that the investments taxonomy has been based on their macroeconomic impact on stability and "green" growth. We propose to classify investments in Armenia according to the above approach: "productive" or "non-productive", "additional" and "non-additional".

Productive **investment supports the expansion of an economy's productive capacity while promoting decarbonization and preserving our planet's natural assets, also** promoting macro**economic sustainability**. These investments focus on developing and expanding sectors that contribute to **green growth** by reducing negative environmental impacts and supporting sustainable development. Green productive investments are a critical component of the transition to a green economy.

Non-productive **investments** may not directly increase the productive capacity of the economy in terms of output but contribute significantly to environmental protection, climate resilience, and long-term sustainability. These types of investments focus more on environmental and social benefits rather than immediate economic returns. Their purpose is to help protect other productive capital, not to add to it (Policy Framework for Investment - Pocket Edition, 2015).

Both types are essential for transitioning to a *green* economy, but they have different roles and impacts on economic growth and macroeconomic sustainability.

In the context of the macroeconomic impact, above-mentioned criterion of **additionality** versus **non-additionality** is a key concept in evaluating the effectiveness of green investments. It helps to determine whether the funds allocated to green investments result in a net increase in overall investment in the economy or if they merely replace or displace other forms of investment without adding to the total economic activity. This distinction is critical for understanding the true impact of green investments on economic growth and sustainability. This has much to do with how the green investment is financed.

Additionality refers to the extent to which a green investment leads to **new** or **additional** spending that would not have occurred otherwise. In other words, it means that the green investment leads to a net increase in overall investment in the economy and does not simply replace or crowd out other types of investments.

Non-additionality refers to situations where the green investment **displaces** other types of investments, meaning that the overall level of investment in the economy remains the same or does not increase. This occurs when green investments are financed by diverting funds from other existing investments, rather than creating new sources of funding or stimulating new economic activity.

So, the way in which green investments are financed plays a crucial role in determining whether they are additional or non-additional. Several financing options can influence this outcome:

By combining the two criteria of macro**economic impact** (productive vs. non-productive) and **additionality** (additional vs. non-additional), we can derive a cross-cutting classification of green investment. These categories help better understand the potential effects of green investments on the economy, considering both their contribution to macroeconomic output and whether they increase or displace overall investment in the economy.

Table 1

Summary of the investments' macroeconomic impact.

	Productive investments	Non - Productive investment
Additional investments	• Contributes to GDP growth by increasing productive capacity • Net increase in overall investment	• No direct contribution to GDP but helps long-term sustainability • Net increase in overall investment
Non – additional investments	• Contributes to GDP growth but displaces other investments • No net increase in total investment	• No direct contribution to GDP and displaces other investments • No net increase in total investment

Source: Composed by the authors based on the analyses.

Short- and long-term macroeconomic effects depend on the extent to which green investment is additional or productive. If the finances injected into the RA economy are situational, unregulated, not allocated and targeted according to the above-mentioned principles, can put the economy at risk of economic instability. Misunderstanding or mismanaging the strategic direction of green investments can indeed put the economy at risk of macroeconomic instability.

An analysis of the structure of Armenia's economy will allow us to identify the main sectoral priorities that will ensure the maximum macroeconomic results of the investments. The economy of the RA, like all other national economies, has its own unique starting macroeconomic structural features, faces unique challenges and opportunities in transitioning to a green economy, and understanding the existing economic structure is crucial for the effective implementation of green investments.

Highlighting the main structural features of the Armenian economy can help to understand how green investments can impact the country's macroeconomic stability**.**

Armenia's economy overview

During 1990-2023, Armenia's economy has undergone a profound transformation. Thus, in 1990 the industrial sector accounted for 29.7% of GDP, in 2000 - 25.2%, while in 2023 this indicator was 16.5%. In **1990**, the industrial sector accounted for **29.7%** of Armenia's GDP. This was a time when Armenia's economy was heavily reliant on industries such as mining, energy production, and manufacturing, all of which were major contributors to the economy during the Soviet era. This creates both challenges and opportunities for green investment, which needed to be carefully balanced.

Similarly, agriculture, being one of the main sectors of the economy, has been declining since 2000, and reached 8.5% of GDP in 2023. Instead, the share of trade and services continuously expanded from 28.2% in 1990 to 59.4% in 2023.

By **2023**, the share of the industrial sector had further dropped to **16.5%** of GDP, indicating a shift toward a more service-oriented economy, with industries like IT, finance, and tourism becoming more prominent.

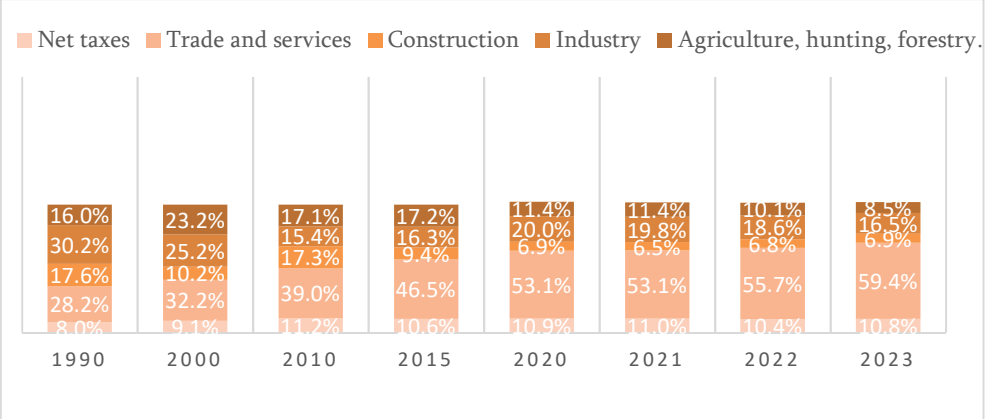
The transformation of Armenia's economy from a heavily industrial base in 1990 to a more service-oriented economy by 2023 reflects broader global trends of deindustrialization, as well as Armenia's specific historical and geopolitical challenges. The shrinking industrial sector has been offset by growth in other areas such as services and technology, which have become the main drivers of economic growth. However, the challenge for Armenia moving forward will be to diversify its industrial base and ensure that the growth in services and technology continues to be sustainable, inclusive, and well-

integrated into the global green economy (see Figure 1).

Truly appreciate the significant impact that the service sector can have on the environment by adhering to green practices; it is first important to recognize the wide array of concerns that comprise this segment of the economy. The service economy is indeed a multi-faceted entity spanning many diverse industries. There are researches, illustrating the various ways in which the industries comprising the service sector might embrace a green orientation: The greening of services matrix (Grove et al., 1996**)**.

Figure 1

GDP composition during 1990-2023, in %.



Source: Developed by the authors based on the reports of the Statistical Committee of RA, (25.09.2024) https://www.armstat.am/am/?nid=82.

Armenia produced 0.79 million toe of electricity in 2022, of which 31.0% was from nuclear power plant 42.2% from natural gas-fired thermal power plants, 21.1% from hydropower plants, and 5.7% from wind and solar plants. In 2022, the total primary energy supply in Armenia was 4.0 million tons of oil equivalent (toe), of which hydropower (4.2%) and wind, solar PV, and solar thermal (1.5%) were included. Armenia's energy intensity has decreased steadily in recent decades (-21% in 2000-2020). This is due to GDP growing over three-fold during that period, whereas energy consumption (measured by TFC) "only" doubled. The direct, positive correlation between economic growth and energy consumption weakened after 2012 but strengthened in 2019 (Energy Policy Review, Armenia 2022). The 12.7% decrease in energy intensity from 2021 to 2022 indicates a return to improving energy efficiency after the 2020 disruption. The trend suggests that Armenia's energy intensity improvements are part of a longer-term effort to modernize the energy system and reduce the environmental footprint of economic growth (Armenia energy factsheet 2022, Energy balance of the RA 2022). According to the **RA Energy Sector Development Strategic Program (2021–2040)**, the government has set targets to significantly increase the share of **solar energy** in the country's energy mix. Specifically, the program outlines the goal of achieving **at least 15%** of total energy generation from **solar energy** by **2030**, which is expected to amount to **1.8 billion kWh** of electricity.

The roadmap for energy-efficient buildings in Armenia (2020-2040) represents a comprehensive and multi-faceted approach to improving the country's building stock,

reducing energy consumption, and contributing to sustainability and climate change mitigation. By setting ambitious goals, promoting green construction practices, retrofitting existing buildings, and fostering public-private partnerships, Armenia can create a more energy-efficient and sustainable built environment that benefits its economy, environment, and citizens (Energy-Efficient Buildings in Armenia: A Roadmap Insights and pathways for better buildings 2020-2040).

In order to reduce environmental pollution, reduce the amount of exhaust gases and stimulate the use of environmentally friendly vehicles, the RA is pursuing a policy aimed at the development of electric vehicles, including in terms of infrastructure necessary for operation. In 2022, 2,663 vehicles were imported into our country; in 2021, 1,898 vehicles; yet in 2024, it has been already almost 8000[1].

By 2040, Armenia aims to transition to a low-carbon, sustainable transport system that includes a predominantly electric public transport fleet in urban centers, extensive bike-sharing programs in all major cities and a seamless, multi-modal transport network integrating electric buses, trams, bicycles, and walking (Armenia: Transport and Trade Facilitation Strategy, 2020–2040).

Energy and agriculture are two key sectors in Armenia that contribute significantly to greenhouse gas (GHG) emissions, with a combined share of 85.2% (66.7% from energy and 18.5% from agriculture). These sectors present substantial opportunities for climate mitigation and emission reductions. By focusing on these areas, Armenia can make significant progress toward achieving its climate goals and contribute to the global effort to combat climate change. International programs have significantly contributed to the restructuring and modernization of Armenia's agricultural sector. The support from programs like ENPARD**,** FAO**,** the World Bank**,** USAID and others has focused on improving agricultural productivity, promoting sustainability, and addressing environmental challenges such as water scarcity and soil degradation. These programs help farmers adopt climate-resilient practices**,** improve access to markets**,** and modernize farming systems to ensure long-term food security, economic growth, and environmental sustainability in Armenia.

Green investments in the RA economy

The principles of sustainable economic growth, social development, and environmental protection are enshrined in the RA 2014-2025 Strategic Program of Prospective Development, and in "The Strategy of the Main Directions Ensuring Economic Development in Agricultural Sector of the RA for 2020-2030". Here, is the classification of the green investments:

1. PRODUCTIVE AND ADDITIONAL GREEN INVESTMENTS

Short-term economic implications for Armenia's economy:

- **Capital and GDP growth**: they can increase the capital expenditures and employment, which in turn can affect other expenditure components of GDP, leading to growth with a double effect.
- **Increased economic activity**: They can stimulate new productions in sectors like renewable energy, green transport, construction, ecotourism, leading to new markets and increasing green GDP.

Long-term economic implications** for **Armenia's economy:

[1] State Revenue Committee of RA. Online at: https://src.am/en/getNews/705, seen 20.10.2024, seen 01.09.2024.

- **Sustainable growth**: This type of investment will build new infrastructure and structure of economy, and Armenia can transition to a more sustainable growth model.
- **Energy independence**: Investments in the renewable energy sector (solar and wind) will reduce Armenia's dependence on imported fossil fuels, improving energy security and reducing trade deficits, also ensuring macroeconomic stability and creating new development opportunities
- **Strengthening competitive positions**: By embracing green technologies and industries, Armenia can become a strong economy in the region in **sustainable development** and **green technology innovation**, attracting additional international investments and becoming more competitive in the green capital market globally.

In the context of Armenia's green transition, it is important to ensure that green investments, both productive and additional, should maximize their economic and environmental benefits:

- Renewable energy and energy efficiency (solar energy, wind farms, etc.)
- Sustainable agriculture and water management (climate-resilient farming, water conservation technologies, etc.)
- Green infrastructure development (sustainable cities, green buildings, eco-transportation systems)

So, by focusing on both productive and additional green investments, Armenia can drive a sustainable economic transition that promotes growth, resilience, and environmental sustainability over the long term.

2. PRODUCTIVE AND NON-ADDITIONAL GREEN INVESTMENTS

The combination of **productive** and **non-additional** investments plays a unique role in shaping the economy's transition to a more sustainable and green future. These are investments that contribute to the economy's productive capacity (productive) but **do not** lead to a net increase in overall investment in the economy (non-additional). Instead, they displace or reallocate investment from other sectors.

Short-term implications for Armenia's economy:

- **Limited economic stimulus**: Non-additional green investments in Armenia, such as transitioning to renewable energy or upgrading infrastructure, may not create immediate growth in total investment or GDP. However, they reduce costs and help **improve energy efficiency**, which can enhance long-term competitiveness, especially for energy-intensive sectors like manufacturing.
- **Increased economic activity**: Investments can generate jobs in new industries and help diversify Armenia's economy.

Long-term implications for Armenia's economy:

- **Sustainable growth from productive investments**: They will help the economy to enhance its **industrial productivity** while promoting **environmentally sustainable growth**. Over time, Armenia could benefit from a **greener, more resilient economy** that is better able to withstand environmental shocks.
- **Economic diversification**: Both productive and non-additional green investments are important for diversifying Armenia's economy away from **energy-intensive and polluting sectors**. Investing in green technologies, sustainable agriculture, **water-**

efficient farming technologies, and renewable energy could open up new industries and reduce Armenia's reliance on its **mining** and **energy extraction** industries.

- **Environmental resilience and competitiveness**: Non-additional investments contribute to Armenia's **environmental resilience** by reducing emissions, improving waste management, and enhancing the efficiency of existing systems. Over time, these investments will make Armenia more competitive in global markets that are increasingly focused on sustainability.
- **Green infrastructure**: Expand investments in **green public transportation** (electric vehicles, public transit systems), **smart cities**, and **energy-efficient buildings** to create sustainable urban growth and reduce environmental degradation.

3. NON-PRODUCTIVE AND ADDITIONAL GREEN INVESTMENTS

These investments do not directly contribute to economic output in terms of goods and services (non-productive) but result in a net increase in investment in the economy (additional). They primarily focus on environmental sustainability, resilience, and ecosystem protection.

Short-term economic implications for Armenia:

- **Environmental health**: These investments can't contribute directly to short-term GDP growth, but they improve environmental quality, which can lead to a higher quality of life.
- **Government spending**: Government expenditure on non-productive but essential green investments, such as **public awareness campaigns** or **environmental monitoring programs**, may result in higher fiscal outlays in the short term but will contribute to the long-term sustainability of the economy.

Long-term economic implications for Armenia's economy:

- **Increased resilience**: Over time, these investments will enhance Armenia's resilience to climate change, environmental degradation, and resource depletion. The direct macroeconomic benefits of these investments may not be immediately apparent, but avoiding future costs related to environmental damage or climate impacts will be significant.
- **Sustainable growth**: As the economy adapts to environmental challenges and benefits from cleaner air, water, and ecosystems, long-term **economic growth** will be supported by these investments, leading to a more sustainable future.
- **Global competitiveness**: Armenia's efforts in environmental protection and sustainability could position it as a regional strong leader in **green innovation** and attract international financing and partnerships for future green projects.

In Armenia, **non-productive and additional green investments** are essential for addressing environmental challenges and supporting the country's long-term sustainability goals, focusing attention on improving environmental conditions, addressing climate change, and reducing environmental degradation. Such investments are very important for Armenia as it seeks to transition towards a **greener, more sustainable economy** while managing the impacts of environmental challenges. Below we define some directions, which are crucial in Armenia.

- Green energy projects
- Pollution control and environmental clean-up
- Reforestation and forest conservation
- Waste management and recycling initiatives
- Ecotourism infrastructure
- Urban green spaces and sustainable infrastructure
- Biodiversity protection and nature reserves
- Green finance and investment mechanisms
- Environmental education and research

4. NON-PRODUCTIVE AND NON-ADDITIONAL GREEN INVESTMENTS

These are investments that do not contribute directly to economic output (non-productive) and do not lead to an increase in the total amount of investment in the economy (non-additional). They often represent a **shift in resources** rather than new investments.

While non-productive and non-additional green investments can't directly contribute to real GDP growth, they can contribute to green GDP growth. They play an important role in maintaining the health of a country's environment. The macroeconomic importance of these investments lies in their ability to maintain the health of ecosystems and avoid long-term damage, rather than in contributing to new productive capacity.

*Short-term economic **implications for Armenia's economy:***

- **Minimal impact on GDP Growth**: As these investments do not lead to increased production or the creation of new productive capacities, they will likely have little to no immediate impact on the economy's GDP.
- **Government expenditure**: These investments might represent an **ongoing government expenditure** on environmental upkeep, which could increase public spending in the short term without resulting in an immediate economic return. However, the latter's impact on green GDP growth will definitely be positive.

Long-term economic implications for Armenia's economy:

- **Environmental stability (upkeep): T**hese investments can contribute to maintaining environmental sustainability, **avoiding future environmental damage** and preventing future environmental crises, which in turn can harm the economy by undermining macroeconomic stability.
- **Public health improvements**: This type of investment can contribute to better public health outcomes, reducing long-term healthcare costs, and improving peoples' productivity. For instance, maintaining clean air and water standards prevents costly diseases and conditions caused by pollution.
- **Sustainability**: Keeping Armenia's ecosystems, pollution control systems, and natural resources healthy and functional ensures that the country can avoid large-scale environmental disasters, which would be far more costly to manage if left unaddressed.

So, this type of investments in Armenia is critical for addressing environmental issues, ensuring regulatory compliance, and mitigating the impacts of **environmental degradation**. While these investments may not contribute directly to short-term economic growth or GDP, they are essential for **long-term sustainability** and **public health**. By making

necessary investments in **pollution control**, **remediation**, and **environmental infrastructure**, Armenia can avoid future economic risks, enhance its reputation in the global green economy, and maintain a healthier environment for future generations.

- Compliance with environmental regulations
- Maintenance of existing environmental infrastructure (waste management, water purification, or sewage treatment services)
- Fixing environmental damage
- Carbon offsetting programs

Results

Within the framework of the above-mentioned logic of presenting investments according to their macroeconomic impacts, here are highlighted the main directions of the RA economy that can contribute to the growth of the green economy.

1. Energy transition (green productive investments)

Armenia highly depends on energy imports, particularly **natural gas**. However, it also has great potential for **renewable energy** sources like **solar**, **wind**, and **hydropower**. Green energy investments are critical for diversifying the energy mix and reducing dependency on fossil fuels.

- ✓ **Impact on short-term Economy**: **Investments in renewable energy** (e.g., solar or wind power plants) can stimulate economic growth by creating jobs, increasing energy security, and potentially reducing energy costs in the long term. However, these are **productive investments** that require a longer horizon to deliver substantial returns.
- ✓ **Impact on long-term economy**: These investments can significantly increase **economic productivity** in the energy sector and support **sustainable growth**. If the transition to clean energy is not additional (e.g., financed by reallocation from other sectors), it may not increase total investment levels but still can provide long-term benefits, such as reducing the costs of energy imports and improving energy efficiency across other sectors.

2. Agricultural sustainability and innovation (green non-productive investments)

Agriculture is a major part of the Armenian economy, but it faces challenges such as **water scarcity** and **soil degradation**. Investments in sustainable farming practices, such as **drip irrigation**, **organic farming**, or **water conservation technologies**, are essential for ensuring the long-term viability of agriculture.

- ✓ **Impact on short-term economy**: These types of investments might not immediately lead to a large increase in overall GDP or industrial output because they are often **non-productive** investments (focused on preserving resources rather than generating new goods). However, they **stabilize the agricultural sector**, ensuring future food security and agricultural productivity.
- ✓ **Impact on long-term economy**: In the long term, investments in **agricultural sustainability** will contribute to greater **productivity** by maintaining and improving **soil health** and **water resources**. Such investments can prevent significant losses in the agricultural sector caused by environmental degradation, helping to maintain a stable supply of food and agricultural exports.

3. Green infrastructure and urban development (mixed impact)

As Armenia's urban population grows, there is increasing demand for **sustainable urban development**, including **green buildings**, **eco- transportation**, and **waste management** systems. These are **non-productive but additional** investments that focus on enhancing quality of life and environmental sustainability.

✓ **Impact on short-term economy**: **Green infrastructure investments** (such as public transit systems, energy-efficient buildings, and waste-to-energy projects) may **displace investments** in other sectors. If funded by reallocating funds from other projects, it may not contribute to **net economic growth** in the short term. However, they can still have positive effects, such as improving public health and reducing long-term infrastructure costs.

✓ **Impact on long-term economy**: In the long term, **green urban development** can significantly improve productivity by making cities more **livable**, reducing **energy consumption**, and **lowering costs** for households and businesses. Investments in **green infrastructure** can also **attract foreign investment** and contribute to the country's competitiveness.

4. Industrial transition and circular economy (productive and additional investments)

Armenia's manufacturing sector, particularly in the areas of **metallurgy**, **construction materials**, and **textiles**, can benefit from **green industrial practices** like **circular economy models** (e.g., waste recycling, sustainable materials, and low-emission technologies).

✓ **Impact on short-term economy**: In the short term, Investments in transitioning industries to more **sustainable practices** can stimulate economic activity and create jobs, especially if these investments are **additional** and not simply a shift of resources from one sector to another.

✓ **Impact on long-term economy**: In the long term, **green industrial investments** can increase **productivity**, reduce the environmental footprint of the manufacturing sector, and support **economic diversification**. As the global market increasingly shifts toward sustainability, **greening industries** will allow Armenia to remain competitive, attracting green trade and investment.

5. Environmental protection and tourism (non-productive but additional investments)

Tourism is a growing sector in Armenia. The tourism sector, has attracted significant investments, driven by the strong focus on economic modernization and infrastructure development. Investments in **environmental protection** (**national parks**, **forests**, and **biodiversity)**, can enhance the tourism sector.

✓ **Impact on short-term economy**: **Non-productive green investments** in tourism, such as the preservation of natural areas, may not generate immediate economic output. However, there may be **additional investments**, funded by new sources (e.g., international aid or climate funds), thus contributing to the economy in the form of long-term tourism growth.

✓ **Impact on long-term economy**: In the long term, preserving the environment ensures the sustainability of the **tourism sector**, which is a significant contributor to GDP. These investments can improve **tourism revenues**, **foreign exchange inflows**, and **employment** in tourism-related industries.

The green transformation of Armenia's economy will require significant changes and massive investments in various sectors of the economy to achieve sustainable growth while also reducing environmental degradation. Below are highlighted two possible scenarios for Armenia's green transformation, each of which takes into account different levels of investment, policy actions, and technological deployment. The effectiveness of Armenia's transition to a green economy largely depends on the country's economic capacity, resources, institutional framework, and the existing challenges it faces in implementing sustainable development. Here's an analysis of the most effective scenarios for Armenia, considering these factors (see Table 2).

Table 2

Scenarios for green transformation of Armenia's economy

SCENARIO 1: AMBITIOUS GREEN TRANSFORMATION (ACCELERATED GREEN GROWTH)	**SCENARIO 2: GRADUAL GREEN TRANSFORMATION (SLOW BUT SUSTAINABLE TRANSITION)**
Overview: Armenia undertakes an aggressive green transformation with strong policy support, substantial green investment, and the adoption of innovative technologies. The government, private sector, and international donors collaborate to significantly reduce carbon emissions, enhance environmental sustainability, and foster green economic growth. The scenario can be applied in the sector, which currently plays a modest role in the process of ensuring economic growth, but also is a key sector in building a green economy: *agriculture, energy, service /transport, tourism/.*	***Overview**: Slow and steady transformation of key sectors: the economy develops gradually, based on certain predictability and longer-term plans, where green investments are implemented more cautiously and gradually. This approach avoids rapid changes, such as deep technological or systemic transformations, and seeks to preserve current economic structures.* The scenario can be applied in the sector, which currently plays a key role in the process of ensuring economic growth: i*ndustry and manufacturing, food systems, financial services and green finance, construction and buildings.*
✓ Renewable energy expansion**:** Rapid investment in solar**,** wind**,** and hydropower energy production, potentially transforming Armenia into a regional leader in renewable energy. Armenia harnesses its solar potential in regions like the Ararat Valley and expands wind energy in the Sevan and Gavar regions, Aragatsotn and Vayots Dzor, which have favorable conditions for wind power generation. ✓ Energy efficiency: Large-scale retrofitting of energy-efficient buildings, smart grids, and electric vehicle infrastructure across cities like Yerevan and Gyumri**.** ✓ Green transport: Implementation of electric public transport systems, bike-sharing programs**,** and sustainable urban mobility solutions to reduce air pollution and greenhouse gas emissions in urban centers. ✓ Sustainable Agriculture: Broad adoption of organic farming**,** drip irrigation, and sustainable water use techniques. The government incentivizes farmers to transition to eco-friendly practices, supported by green financing. ✓ Circular economy and waste management:	✓ **Renewable energy development**: Support for the development of renewable energy and the creation of energy storage infrastructure. ✓ **Energy efficiency and green buildings**: Implementation of **energy-efficient building codes** and gradual retrofitting of buildings. However, the shift is not widespread in the short term, and incentives for energy-efficient appliances and home improvements remain limited. ✓ **Sustainable agriculture**: Transition to **eco-friendly farming** practices proceeds gradually, with subsidies and incentives targeting small-scale farmers. However, traditional agriculture still dominates, and green technologies are adopted at a slower pace. ✓ **Transport and mobility**: The gradual introduction of **electric vehicles (EVs)**, expansion of **public transport**, and **bike lanes** in larger cities like **Yerevan**. However, **private car ownership** remains dominant. ✓ **Waste management**: Waste management practices are improved, but the transition to a fully **circular economy** is slower. The changes

The introduction of circular economy principles where waste is minimized, and materials are reused or recycled. Investment in waste-to-energy projects and eco-friendly waste management infrastructure in cities.	being implemented are more cautious and gradual, based on bilateral co-chairs and conservative strategies. The modest scenario emphasizes efficiency and resource conservation without major systemic changes.
Economic and environmental implications on Armenia's economy:	***Economic and environmental implications on Armenia's economy:***
✓ **Economic growth:** Economic growth is achievable, but it requires a comprehensive strategy that balances rapid development with effective risk management. Growth must be pursued in a way that ensures stability and sustainability in the long term. ✓ **Job creation:** The green transition has enormous potential for job creation in a range of sectors. But addressing the challenges of job mobility and skills gaps is essential to securing the benefits of this transformation. ✓ **Environmental impact:** Achieving near carbon neutrality is an ambitious but achievable goal for Armenia. By focusing on renewable energy, sustainable transportation, energy efficiency, carbon capture, waste reduction, and green investments, Armenia can significantly reduce its greenhouse gas emissions while positioning itself as a regional leader in sustainability. ✓ **Sustainability:** This development scenario will enable Armenia to move to a new level of sustainability. By harnessing its natural resources, developing green technologies and promoting green growth, Armenia can improve its sustainability outcomes. The green transition will require significant investments and policy reforms.	✓ **Economic growth**: The role of the green sector in the structure of economic growth is certainly highlighted, but it is not yet tangible. The structure of the economy is gradually changing in favor of green sectors. ✓ **Job creation**: Steady growth in green jobs, although the growth rate lags behind the changes recorded in the ambitious scenario. Workers who choose to participate in the green economy must have new skills related to environmental regulations, new technologies, or sustainable systems. ✓ **Environmental impact**: The slow growth model will ensure slow but steady economic growth, quality jobs, while reducing environmental risks (slower progress towards **carbon neutrality)**, promoting the adoption of new economic relations and sustainable practices by all, taking into account the limited nature of resources, and creating an environment and outcomes that promote macroeconomic stability. ✓ **Sustainability**: The economy is transitioning to a more sustainable growth model, but it faces challenges in fully transitioning to a green economy in the short-to-medium term. Modest growth does not imply quick results, but it can ensure a more stable and gradually developing economy, taking into account certain challenges and opportunities.

In the modest green transformation scenario, we can move to the green transition at a slow pace, given the limited amount of investment. In the modest green transformation scenario, a small part of all investments is diverted to green investment, but the main part of this green investment is assumed to be productive. This scenario we can apply in such sectors, which provide GDP growth now, because, a sharp outflow of investments from non-green sectors may put the Armenian economy in front of a sharp decline.

These scenarios are intended to provide an analytical assessment of the green transformation in Armenia. Here we have to make a choice about how much we are willing to replace the current growth for the sake of building a green economy. This transformation must be achieved over time but also in time. Long-term planning is particularly important in the case of long-lived infrastructure. We must take particular care in our investment decisions regarding power plants, buildings and transportation infrastructure, which may not be easily replaced or retrofitted. Urban development is one of those areas where today's choices will have consequences on emissions for decades to come. The emissions from these investments could be locked in for decades, as premature removal of such infrastructure would be costly (Long-term climate strategies, 2018).

The agriculture sector faces challenges like capital undernourishment, low productivity and limited modernization, environmental degradation, and the intensity of *Scenario 1*, focused on rapid transformation and maximizing efficiency, can be essential for the sector's growth and sustainability. But the service sector faces other challenges such as digital transformation, adaptation to technological changes, cybersecurity and data privacy, quality control, and social responsibility, which require a special approach to transformation. *Scenario 2,* which prioritizes a slow transformation, can be more effective in ensuring that changes are sustainable, inclusive, and aligned with the sector's long-term growth. Thus, the choice of scenario depends on the economic situation, sectoral development strategy, and capital volumes. A combination of scenarios can also be applied for both rapid and gradual changes at the same time, using a combination of advantages depending on the situation and resources. The combination can be achieved by integrating two different approaches (an initial rapid change and a careful, gradual transition), where rapid changes are implemented in some areas, and later and more careful changes in others.

Thus, the ***most effective scenario for Armenia*** *will likely be a* ***hybrid approach*** *combining elements of both of them.*

The draft version of the "Green and sustainable economic development strategy" and the Government programs contain defined indicator targets that can be realistic in both the short and long term if investments are allocated to economic sectors in a targeted manner, as a regular step in the ongoing strategic plan, rather than being situational and implemented within the framework of a separate local project that is not part of the process ((Republic of Armenia Government Program (2021-2026)). Fostering international partnerships, public-private collaboration, and a strong policy framework is key to ensuring that economic growth, and environmental and economic sustainability go hand in hand.

Conclusions

The Green Economy not only does not limit or slow down the possibility of ensuring economic growth in the current period, but also, as a result of the application of a balanced policy and incentive system, can guarantee the expansion of the potential for economic development, while ensuring the minimum possible risks to the environment and social security as a result of economic activity (Green and sustainable economic development strategy" draft - decision of the government of the Republic of Armenia).

While the progress has been significant, more remains to be done to ensure that green investments become a central pillar of Armenia's economic growth strategy. Continued investment in infrastructure, policy reforms, and green finance mechanisms will be necessary to fully capitalize on Armenia's green potential. Basing on its priorities and characteristics, Armenia forms its own green growth agenda, for the implementation of which the following main directions are distinguished: productivity and competitiveness, income growth and job creation, innovative development, mastering new markets and new sectors, more balanced macroeconomic environment and stability.

The formulation of a green economy can lead to the fundamental principles of sustainable development. Summarizing the analyses some assessments of the macroeconomic impact of green investments on the RA economy can be highlighted:

- ✓ **Short-term growth and stabilization**: In the short term, **additional** green investments in sectors of the economy targeted by the RA government, such as **renewable**

energy and **green infrastructure** could stimulate demand and economic activity. However, if these investments are **not additional** and are funded by reallocating resources, the short-term economic impact may be muted, and other sectors could experience a slowdown.

- ✓ **Long-term sustainability and productivity**: In the long term, **productive** green investments in sectors of the economy targeted by the RA Government, such as in **energy (efficiency)**, **agriculture**, transport, ecotourism and **green industries, will stimulate the creation of new and green jobs,** boost **economic productivity** and reduce environmental risks, leading to sustainable economic growth. However, **non-productive** investments, while important for environmental sustainability, may not have immediate positive effects on GDP unless they are complemented by productive projects.
- ✓ **Innovation:** Financing the **green innovative sectors** can help move the economy away from resource extraction toward more sustainable, knowledge-based industries. The transition to a green economy can create new opportunities for development and growth for the RA by stimulating innovation and investments in more sustainable sectors of activity, shaping and expanding practices that contribute to sustainable development, creating new green jobs, creating new sectors of activity, and also achieving social and environmental goals. The high-tech sector is one of the priorities of the RA government, based on the motives of the RA economy and security. The results recorded in the sector are a valuable resource for the development of other sectors of strategic importance for the economy.
- ✓ **Economic diversification**: Armenia has the opportunity to leverage **green investments** to **diversify its economy**. Effective and balanced allocation of investments across all sectors of the economy will allow for the formation of a new structure that will be more diversified, conducive to stability, and ensuring balanced growth
- ✓ **Environmental resilience and sustainability**: With a focus on **green investment** and **environmental protection**, Armenia can ensure that its natural resources continue to support economic activities. Promoting green investments will help improve public health as a result of reducing the level of environmental pollution, which will be possible due to green and clean technologies, sustainable transport, healthy food production and consumption, and promotion of a healthy lifestyle. And fiscal and legislative levers will help ensure the rational and integrated use of subsoil in the industrial sector, exclude the overexploitation of natural resources, promote the targeted and economical and efficient use of land resources in the agricultural sector, and reduce the rates of deforestation, land degradation, and waste volumes in the construction sector.

References

Armenia energy factsheet 2022. Online at: https://armstat.am/file/doc/99544448.pdf , seen 10.06.2024

Armenia: Transport and Trade Facilitation Strategy, 2020–2040. Online at: https://www.adb.org/sites/default/files/project-documents/52353/52353-001-tcr-en.pdf, seen 10.06.2024

Energy balance of the RA 2022. Scientific Research Institute of Energy, 2024.

Energy Policy Review, Armenia 2022. Online at: https://iea.blob.core.windows.net/assets/8328cc7c-e65e-4df1-a96f-514fdd0ac31e/Armenia2022EnergyPolicyReview.pdf , seen 10.06.2024

Energy-Efficient Buildings in Armenia: A Roadmap Insights and pathways for better buildings 2020-2040. Online at: https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/11/energy-efficient-buildings-in-armenia_7f7a8b5c/f9421a97-en.pdf , 02.06.2024

Green and sustainable economic development strategy; draft - decision of the government of the RA. Online at: https://www.e-draft.am/en/projects/6062 , 07.08,2024

Grove et al., Going green in the service sector: Social responsibility issues, implications and implementation. European Journal of Marketing. 1996, 30. 56-66.

Jackson T. and Peter A. Victor, The Transition to a Sustainable Prosperity-A Stock-Flow-Consistent, Ecological Economics, 2020, Vol 177., pp. 1-14.

Long-term climate strategies, Climate action with tomorrow in mind, Expert Perspectives, 2018, Volume 1, 161 p, Online at: Expert-Perspective-book.pdf, seen 07.10.2024

Policy Framework for Investment - Pocket Edition 2015. Online at: https://www.oecd.org/en/topics/sub-issues/sustainable-investment.html , seen 09.09.2024

RA Government Program (2007). Online at: https://www.gov.am/files/docs/83.pdf , seen 05.07.2024

RA Government Program (2013), point 3.4.4. Online at: https://www.gov.am/files/docs/1149.pdf , seen 02.06.2024

RA Government Program (2014), point 2.4.4. Online at: https://www.gov.am/files/docs/1321.pdf , seen 09.09.2024

RA Government Program (2019), point 4.8. Online at: https://www.gov.am/files/docs/3133.pdf , seen 06.08.2024

RA Government Program (2021-2026). Online at: https://www.gov.am/files/docs/4586.pdf , seen 05.05.2024

Regulation (EU) 2020/852 on the establishment of a framework to facilitate sustainable investment. Online at: https://www.europeansources.info/record/proposal-for-a-regulation-on-the-establishment-of-a-framework-to-facilitate-sustainable-investment/ , seen 08.03.2024

State Revenue Committee of RA. Online at: https://src.am/en/getNews/705, seen 20.10.2024, seen 01.09.2024