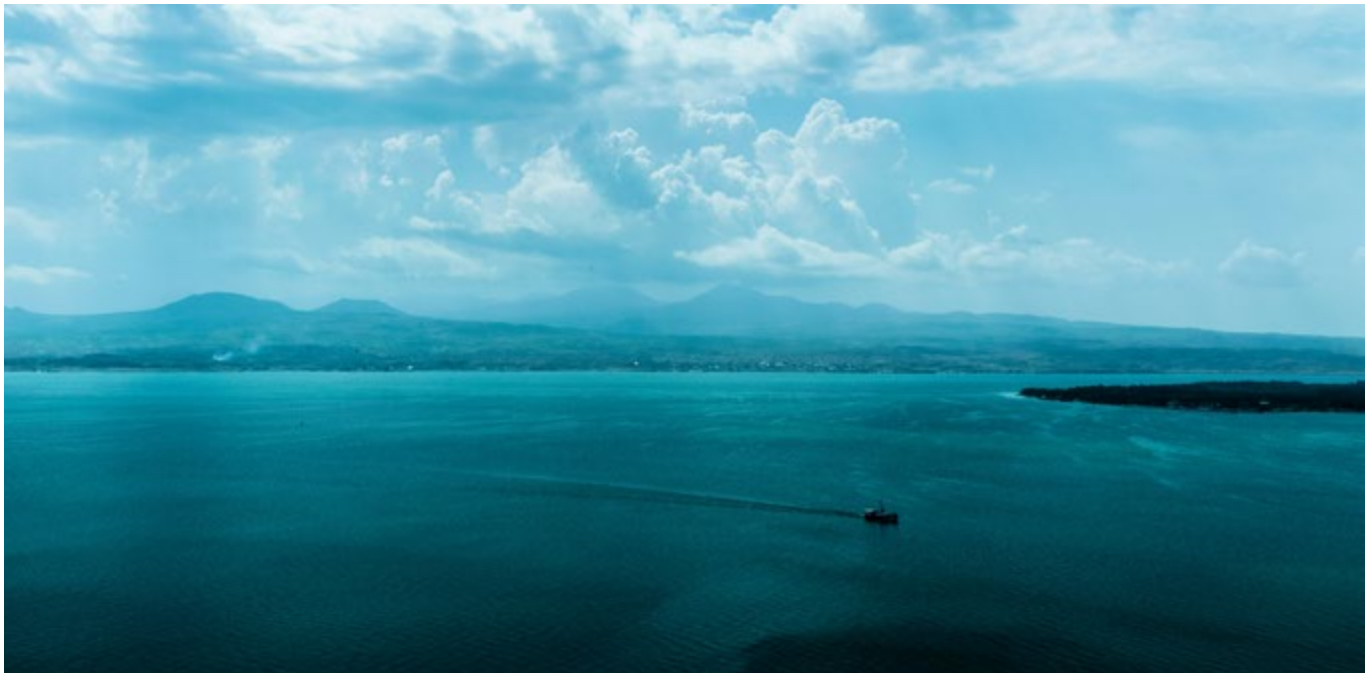
GEFF Green Economy Financing Facility

European Bank for Reconstruction and Development

Where finance and green technologies meet

GEFF in Armenia Newsletter N8, Q4 2020



Key results as of December 2020

- GEFF in Armenia has financed 199 projects with a combined volume of EUR 17.65 million through four Partner Financial Institutions (PFIs), thus reducing primary energy usage by 82,271 MWh/year and saving 19,634 tonnes of CO2 annually and 5,171 m3 of water per year.
- **26.7 MW installed capacity** of renewable energy projects makes it possible to **avoid 16,428 tonnes of CO2 annually**.
- 1,802 EE and RE technologies from 164 vendors at 21 sites around Armenia are made accessible through the Green Technology Selector at https://ts.ebrdgeff.com/armenia

26.7 MW installed capacity =

- annual electricity usage of 60,000 people.
- 6.3% of total installed capacity in Armenia (425.4 MW, as of beginning of 2020).
- yearly electricity required for 11,000 e-cars (e.g. Nissan Leaf).

16,428 tonnes of CO2 avoided annually =

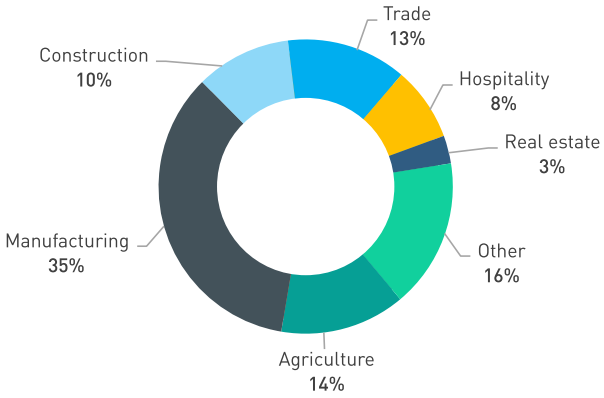
- equivalent of the greenhouse gas emissions from 3,549 non-electric passenger vehicles driven for one year.

Highlights of GEFF activities for the entire project

GEFF in Armenia's first phase has nearly come to an end. The results are promising: highly diversified investments significant economic, energy and environmental impact. A detailed look at loan disbursements shows that the GEFF covers a large range of investments fromthe smallest sub-loan amount of EUR 2,500 to the volume of the largest investment was more than EUR 1 million. All in all, the average sub-loan amount stood at EUR 90,000. These figures illustrate that both micro businesses and larger enterprises benefit from GEFF support.

Apart from supporting renewable energy projects, important achievement is financing of other energy efficiency investments. The GEFF PFIs managed to diversify their lending activities and distribute funds to finance investments from very different technological areas, including equipment, technologies and vehicles. Almost half of the supported investment projects are focused on processing equipment such as diary production machines, bakery ovens and paper processing equipment.

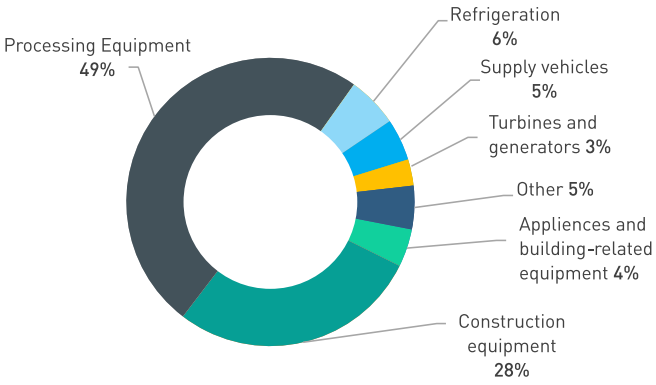
Breakdown by business sector



This development is the result of efforts to address the country's key economic sectors. Particular mention should be made of production and manufacturing, as well as building construction and building-related investments; the latter includes wall insulation, air conditioning, construction technology and equipment, all of which are beneficial for both developers and residents.

The joint efforts of the GEFF in Armenia and the four local partner institutions also significantly support the fulfilment of Armenia's commitments under the UNFCCC and the Kyoto Protocol: the country's Intended Nationally Determined Contribution (INDCs) indicates that industrial processes (construction materials and chemical production)

Breakdown by EE investment



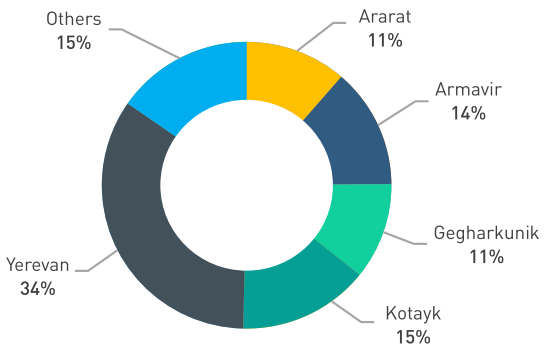
and urban development (including buildings and construction) are priority sectors for the implementation of mitigation measures. Both sectors have been major emitters of GHG and still hold potential for energy efficiency improvement.

The regional outreach of the GEFF support was strong, with all regions in the country being addressed thanks to the efforts made by the PFIs, their branch networks and regional presence.

It is very interesting and noteworthy that the investment volume of GEFF-supported projects was even higher in rural areas (58%) than in urban regions (42%).

In Armenia, GEFF provides financing, advice and incentives to help businesses become more competitive through investments in high-performance technologies and the adoption of energy efficiency practices. The Facility is a product of the EBRD, supported by the GCF and the Scaling-up Renewable Energy Programme (SREP) of the CIF. The Facility is currently supporting Armenia's green economy transition with USD 20 million in funding through PFIs.

Breakdown by region



Success Story

Armos LLC is an Armenian producer of leather goods (shoes, bags, jackets, etc.). They have invested in a CNC milling machine (CNC FH 850L).

Investor	Armos LLC
Location	Yerevan, Armenia
Investment	CNC milling machine
Investment size	US$ 76,000
Financial results	Payback > 10 years
Electricity savings	48 MWh per year
Primary energy savings	87 MWh per year
CO_2 savings	21 tonnes per year
Impact	Increased operational efficiency, manual labour reduction, higher quality and productivity
Donor	GCF

Chanaparh LLC is one of the largest Armenian road construction companies. They have invested in asphalt mixing plant "Ammann ABC 180 Solidbatch".

Investor	Chanaparh LLC
Location	Kotayk region, Armenia
Investment	Asphalt mixing plant
Investment size	US$ 1,274,000
Financial results	Payback 9 years
Energy savings	55 MWh per year
Natural gas savings	569,587 Nm3 per year
Primary energy savings:	5,926 MWh per year
CO_2 savings	1,089 tonnes per year
Impact	Increased operational efficiency, higher quality and productivity
Donor	GCF

Read more Success Stories.

Electric vehicles in Armenia

Interesting facts you may not know about electric vehicles

Armenia has significant solar energy potential. Taking into account the favourable climatic conditions and the 2,500 hours of sunshine per year on average, different feasibilInteresting facts you may not know about electric vehicles.

Armenia's inventory of passenger cars is among the oldest in the region, with an average vehicle age of 15-20 years. Recently the government has implemented a number of measures aimed at stimulating the purchase of newer and eco-friendlier cars, and in this way has also starting to improve the framework conditions for electric vehicles (EVs). Apart from VAT exemptions on the import of EVs until the end of 2021, such cars are exempt from parking fees in the capital.

EVs in particular show great promise in helping meet CO2 reduction targets in the transport domain and in reducing local air pollution. These vehicles have become increasingly popular, now that the main barriers – the purchase price and their limited range due to high battery costs – have been overcome through the introduction of more affordable, long-range EVs into the Armenian market.

Despite growth in recent years, fully electric car ownership is low overall in the country, with only around 450 EVs registered as of November 2020, up from only a small number of vehicles five years ago. Accordingly, the government is planning to introduce further measures to incentivise the purchase of these cars, such as supporting the development of charging infrastructure and additional free parking facilities for electric vehicles. There are even plans to produce electric cars in the country; remember, the first Armenian-made electric car was presented at the DigiTec Expo in 2017.

One of the advantages EVs offer in comparison to cars that run on fossil fuels (gas, petrol and diesel)

Source: www.evscharging.com

is the ability to charge the car while parked, thus reducing the need for fast refuelling stations. Cars are parked 90-95% of the time, offsetting the issues of limited range and long recharging times, even with currently available short-range vehicles. However, this requires charging infrastructure at places where users park their cars, including at home, work or in public facilities such as shopping centres. Investments in the necessary charging infrastructure have been slow due to "chicken or egg" reluctance where investors would prefer to see EVs first become more prevalent.

Currently, there is no specific regulation on EV charging stations in Armenia, unlike fossil fuel filling stations. Accordingly, all construction and operation of charging stations for EVs is subject to general technical and other requirements. Since there are no local manufacturers of EV charging stations yet, the equipment is imported and needs to pass the necessary certification for compliance with local standards for electrical installations. As a result, now it is most likely for legal entities to purchase a charging station for the needs of their own vehicle fleet.

The public network of EV charging stations in Armenia consists of fewer than 30 stations with medium-level charging speed. Almost 90% of EVs are charged at home. In order to start developing commercial EV charging stations, a critical number of 4,000 EVs would be required, according to the "plug.am" project. It can therefore be concluded that the local EV market has thus far only been developed by independent enthusiasts.

It should also be noted that there are different types of charging stations. On the one hand, the charging capacity is an important consideration,

as it has a direct bearing on how fast the batteries can be recharged. Apart from this, there are two competing standards for vehicle connectors: CHAdeMO and SAE J1772 Combo. In practice, both connectors work very well and almost all EVs are equipped to utilise either connector.

Finally, the engine of an electric car is much simpler than one powered by fossil fuels, as it has fewer moving parts and no gears. Therefore, the scope for malfunction or breakage is far smaller, and the actual number of parts which may need to be replaced or repaired is also lower. A positive outlook: maintenance and repair will be much lower than for conventionally fuelled cars.

In summary: yes, electric vehicles are one of the most talked about topics in the motor industry today, and not only in terms of technical issues. Further growth in the use of electric cars will also depend on their affordability, so dedicated financing schemes and services targeting these types of cars could be very attractive for potential buyers and will have significant impact. It is clear that the current and future development of EVs will have long-lasting effects on the country and that demand will gradually increase, as demonstrated by the current trend.

How PFIs benefit from GEFF in Armenia

The impact of GEFF in Armenia on the development of green finance activities and portfolios at PFIs is significant, helping them contribute to Armenia's transition to a green economy. As a recap, here are the key benefits PFIs get from partnering with GEFF:

- **Innovative financing options** which help PFIs in designing their financial products, including several vendor financing schemes that facilitate local selection and availability of green technologies, thus providing greater choice to sub-borrowers for green investments.

- **More aware and knowledgeable PFI staff** – trainings provided by GEFF about the principles of energy efficiency and resource efficiency help PFI staff identify sub-borrowers and guide them through the decisions on investing and financing.

- **Deepening solar PV knowledge** through a series of highly targeted trainings by experts and engineers, ensuring that PFI staff can advise clients on financing and also on vendor market screening, best practices for solar PV installations, risks of financing solar PV sub-projects, and mitigation measures.

- **Promotion and visibility of green finance** through joint marketing events, increasing awareness and interest in green technologies and creating more potential sub-borrowers and leads. Through such events, more than 350 people have benefited from ideas, inspiration, knowledge, networking opportunities and business connections, as well as financing opportunities.

- **Peace of mind** in identifying sound green projects, investments and sub-borrowers, with support from a highly experienced engineering team.

All of these measures and the support provided by GEFF contribute to the development of green finance in Armenia and help build a strong foundation for sustainable growth by PFIs and businesses of all sectors and sizes. With the right tools and knowledge, they can dedicate their resources to green investments and continue to grow their business.

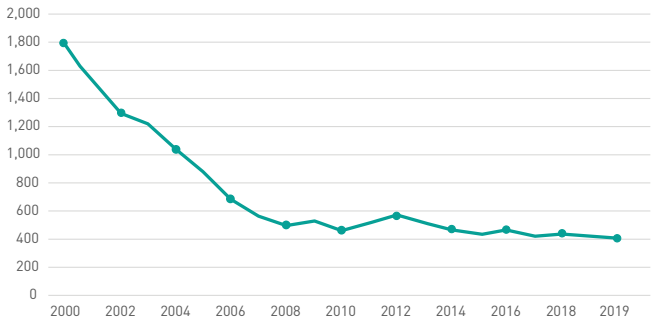
Energy efficiency in Armenia – where are we now?

Relatively cold winters have already led to higher awareness within Armenian society on the cost of energy consumption. In addition, thanks to multiple environmental projects implemented in Armenia over the past few years (e.g. by EBRD, GCF and KfW) aimed at informing the population and businesses, a significant increase in awareness of energy efficiency, renewable energy, water preservation and environmental topics has been observed: various studies concluded that around 65% of the population is widely familiar with the topic. Many businesses have indeed realised that investments in green solutions not only lead to reduced operating costs but also to improved businesses competitiveness, increased output/yields, higher product quality, greater reliability in production and the ability to enter new markets. There is a steadily increasing number of businesses with a good understanding and knowledge of these issues, and they are in fact actively investing in green measures. However, there is still no special interest in investing in green technologies unless there is a corresponding economic benefit. Therefore, the greatest challenge regarding environmental awareness continues to be conveying the importance and significance of energy efficiency investments to the general population.

Global trends indicate economic shifts towards more energy-efficient economies and increasing investments in renewable energy. As a result of rising market demand, the relevant green products and technologies are expanding in Armenia too. For the most widespread energy-intensive technologies like HVAC and lighting systems, there is a sufficient market supply of the newest energy-efficient products in Armenia. All major producers of HVAC and lighting systems have official representatives in Armenia who, although they may not have the entire range of products on hand, can order them in a relatively short period of time. However, there are no representatives in Armenia for larger special-purpose equipment, such as specialised production lines or food-processing machines. This type of equipment is imported, mostly from Russia, Europe or Asia.

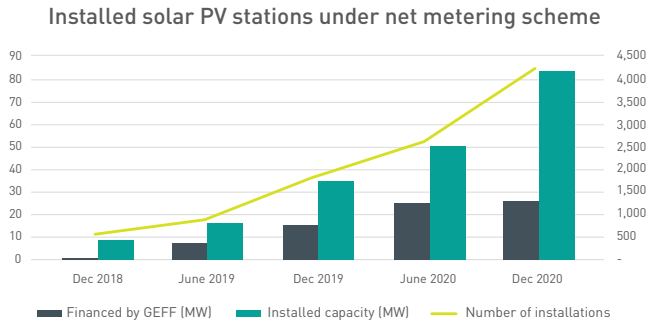
Over the past few years, the Armenian government has made significant efforts to improve the framework conditions for energy efficiency and the use of renewable energies. Aside from further improving the National Energy Efficiency Action Plan (NEEAP) to accelerate implementation of its national energy efficiency policy, other significant steps include: introducing appliance labelling for

Armenia's CO_2 emissions per USD 1m GDP (tons CO_2)



gas-and electricity-consuming appliances (2015), defining requirements for thermal insulation of buildings (2016), further adjusting the feed-in tariff structure through the extension to solar power installations (2017), implementing net metering for solar PV installations (2016, improved 2018) as well as defining the technical regulations on energy saving and energy efficiency in newly constructed multi-apartment buildings and facilities constructed (reconstructed, renovated) with state support (2018).

The further adjustment of feed-in tariffs, and specifically net-metering systems in 2018, led to solid development of solar PV projects in the country. In the last two years alone the installed capacity under feed-in-tariff-based projects increased eightfold and reached around 57 MW, with more than 25 installations (projects under finalisation are included; 2018: 7 MW, 9 projects). The installed capacity under the net-metering scheme simultaneously increased tenfold and reached around 75 MW with almost 4,000 installations, compared to 7.8 MW (700 projects) two years ago. During the same period, the first local solar PV panel production factories were established. There are a few companies that supply and install SHWS and PV systems, as well as a large number of suppliers which carry these products in addition to their core product range. Thanks to the positive development in terms of solar energy use, its share in electricity production had more than doubled by the end of September 2020 (0.76% of total) compared with year-end 2019 (0.32%); this still looks somewhat insignificant, but it represents a promising starting point.



Similar dynamics are observed in other sectors, such as tourism and agriculture. For example, over the past five years more than 250 hotels and resorts have been constructed, and many existing properties renovated with dedication to energy efficiency optimised energy consumption, useful lifetime and the materials. Typical investments comprise eco-friendly thermal insulation, low-E windows, energy-efficient heating systems, LED lighting systems and even rooftop PV systems. In addition, and very important to note, more than 1,700 new jobs were created in this area.

Apart from enormous investments by the Armenian food processing industry in modern equipment and machinery (for production and packaging lines, cooling chambers, etc.), there was also active development in the primary agricultural sector. For example, at present every sixth greenhouse (2019: 1,300 with 177 ha) is operating with high-performing technologies, and an additional 26 ha of greenhouses with the newest technology are under construction. Typical features of such hothouses are polycarbonate covers or two-layer inflatable covers which provide up to 30% energy savings com-

pared to conventional glass-based greenhouses. Another example are forage harvesters, which are becoming popular among Armenian livestock farmers. Such equipment harvests haylage in order to produce silage in particular, and high-performance machines have significant advantages, including energy efficiency-related benefits.

Number of hotels and their employees

	2015	2016	2017	2018	2019
Number of hotels	474	549	556	652	702
Number of employees in hotels	3,445	3,635	4,093	4,748	5,202

Although the residential housing stock has increased by more than two million m2 (around 2%) over the past five years, there is only a small number of energy-efficient buildings, mainly established in the context of international projects such as UNDP. In this connection, it can be mentioned that a newly constructed building under a project of the National Mortgage Company has recently received an energy efficiency passport (class B). Even if the number of relevant buildings is small, it is again a starting point for the implementation of further projects in the construction sector. Additional energy-efficient buildings will follow and the construction of the first Armenian passive house is merely a matter of time.

Each of these small success stories illustrate the current conditions in terms of the economic, environmental and societal impacts of energy efficiency development in Armenia. The implementation of energy efficiency activities is still in its early stages; however, the first and most important steps have been taken and a solid foundation has been set for further development. Finally, yet importantly, energy efficiency is at the heart of any strategy aiming to ensure secure, sustainable and inclusive economic growth.

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