Annex V

Final Report on the Project

Decision 76/35 of THE EXECUTIVE COMMITTEE OF THE

MULTILATERAL FUND FOR THE IMPLEMENTATION OF THE MONTREAL PROTOCOL

Development of Regional center of excellence for training and certification and demonstration of low-global warming potential alternative refrigerants in Eastern Europe and Central Asia

Submitted by the Russian Federation

As of December 2019

CONTENT

Introduction

EXECUTIVE COMMITTEE OF THE MULTILATERAL FUND FOR IMPLEMENTATION OF MONTREAL PROTOCOL at its Seventy-sixth Meeting (Montreal, 9-13 May 2016) approved (Decision 76/35) the demonstration project for the Eastern Europe and Central Asia region on development of a Regional center of excellence for training and certification and demonstration of alternative refrigerants with low-global warming potential (hereinafter referred to as Regional Center), with allocation of funds in amount of US $591,600, plus agency support costs of US $75,076 (total amount US $666,676.00).

In line with Decision 72/40 the allocated funds came from the annual contribution of the Government of the Russian Federation to MLF for 2016 (against the MLF invoice in amount of US $5,290,344.00). The Executive Committee of MLF requested the Government of the Russian Federation to complete the Project within 36 months of its approval (May 2016) and accordingly submit the final report. As a matter of fact the money was wired by MLF to the Implementing agency in July 2017.

According to the Trust Fund agreement between the United Nations Industrial Development Organization (UNIDO) and the Government of the Russian Federation dated 31 August 2017 UNIDO has been implementing the Project in 2017 – 2019.

Objectives of the Project and deliverables

The overall objective of the project is to improve the technical capacity of the refrigeration and air-conditioning sectors in the countries of the Region (Eastern Europe and Central Asia) and consequently facilitate:

- overcoming the barriers on the way to introduction of low-GWP refrigerants;
- improving service practices used on the national level, and
- reducing the level of F-gas emission from the existing refrigeration and air-conditioning equipment.

As result the trained national technicians and designers will enhance their awareness, understanding and promoting introduction of new approaches to energy efficient design and operation on their national market in domestic, commercial and industrial refrigeration and air-conditioning systems.

This project sets up the training and assessment facilities at the Regional Center for the benefit of the countries of the Region, on the basis of using of curriculum document and certification program for the national level corporate employees performing maintenance, servicing or manufacturing of products and equipment relying on or containing F-gases and/or low-GWP refrigerants in line with the requirements of article 10 of (EU) № 517/2014, Directive 2006/40/EC; Regulations (EC) № 303/2008, (EC) № 306/2008 and Regulation (EC) № 307/2008. The Regional Center acts also as a demonstration hub and knowledge base for alternative

refrigerant technology especially for safe handling, application and related systems design using low-GWP refrigerants.

The main deliverables of the Project are as follows:

1. Center of Excellence is established and put into operation with fully equipped training and assessment facilities.

2. Training and certification programs and technical advisory services of the Regional Center are developed and accredited under Real Alternatives certification system.

3. A common draft F-gas regulation harmonized with (EU) No. 517/2014 was developed and published as e-version in Russian and English languages for dissemination among partner countries of the Region.

4. Demonstration Project showing utilization of low-GWP refrigerants and energy efficient design is in place and accessible for conducting study tours and analysis.

5. Common curriculum was developed for providing vocational and academic studies covering refrigeration and air-conditioning service practices.

By collocating the practical training and job certification with the development of expertise in design and systems operation, the Regional Center will be able to provide excellent opportunities for private and public organizations to demonstrate new and innovative technology and the latest refrigeration and air-conditioning systems, components, controls and operating practices. The operating model is therefore based on public-private partnerships where mutual benefit can be derived to achieve the common objectives of improving current practices, performance, energy efficiency and climate impact of refrigeration and air-conditioning systems.

Financial statement as of December 2019

	Component	Funds approved, USD	Disbursement, USD
1	Infrastructure of the Regional Center	128,500	138,697
2	Operation of the Center	39,600	45,347
3	Adaptation and Printing of UNIDO Programmes and Manuals (English and Russian)	51,500	55,500
4	Development of Online Interactive Courses (English and Russian)	58,500	62,500
5	Pilot Refrigeration Plant Based on Natural Refrigerants	214,000	188,261
6	PR Activities	8,500	8,500
7	Internet-portal of the Project (in Russian and English)	28,500	30,295
8	Management, Office	62,500	62,500
	Total:	**591,600**	**591,600**

Main activities and key outcomes

Planning Activity (as per initial project document)	Outputs or service delivered	Outcomes observed
Deliverable 1: Center of Excellence is established and put into operation with fully equipped training and assessment facilities	– With support from the Russian Federation the host side (Ministry of Nature Protection of the Republic of Armenia) nominated the beneficiary for location and establishment of the Regional center of excellence; – Bidding procedures implemented to choose the Contractor/ Service Provider; – The instructors of the Regional center of excellence received training in Moscow on stands operation; – Works completed on production,	Regional center of excellence with training and assessment facilities was put into operation.

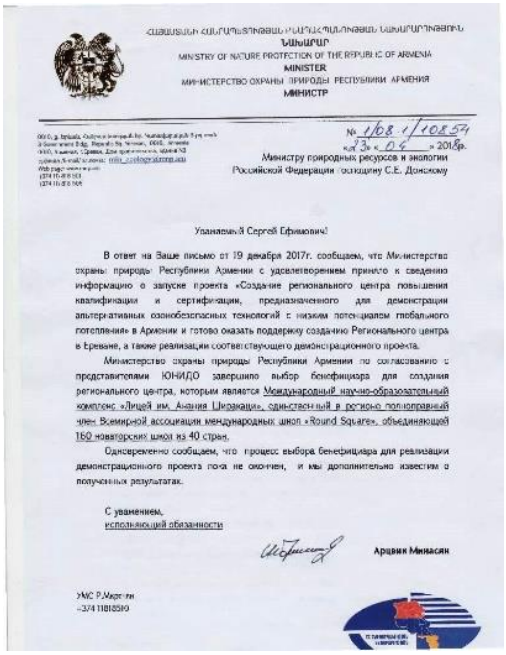
Planning Activity (as per initial project document)	Outputs or service delivered	Outcomes observed
	delivery and installation of equipment at the Regional Center of excellence; – The launching ceremony was held on September 18, 2019. It was a part of the session of the Interstate Ecological Council of the Commonwealth of Independent States (CIS) which was attended by representatives of Environmental ministries, UNIDO, RAC associations and NOUs representatives, technical experts communities and Lyceum students; – 5 trainings were conducted; a new contract was signed to conduct trainings in the Regional Center for 45 technicians representing the Eastern Europe and Central Asia countries.	
Deliverable 2: Training and certification programs and technical advisory services of the Regional Center are developed and accredited under Real Alternatives certification system.	– Bidding procedures implemented to choose the Contractor; – Major part of work on developing training programs and technical advisory services were carried out before December 31, 2018; – Website http://hvaccenter.am/ was created for remote online learning; – 5 trainers were certified (F-gas + Real Alternatives); – The Regional Center was accredited under the Real Alternatives certification system.	Training Center is accredited under the internationally recognized EU certification system of Real Alternatives.
Deliverable 3: A common draft F-gas regulation harmonized with (EU) № 517/2014 was developed and published as e-version in Russian and English languages for dissemination among partner countries of the Region.	– A set of documents on F-gas regulation was translated into Russian (working language in the Regional Center); – Proposal based on F-gas regulation for simplification of certification reasonable for the countries of the Region was developed; – Each country of the Region is expected to consider national regulations harmonization after ratification of the Kigali Amendment.	A set of useful documents was compiled and then translated into Russian language to facilitate development of national regulation and certification systems in the countries of the Region.
Deliverable 4: Demonstration Project showing utilization of low-GWP refrigerants and energy efficient design is in place and accessible for conducting study tours and analysis.	– – The host side (Ministry of Nature Protection of the Republic of Armenia) defined the beneficiary for development of demonstration project; – UNIDO carried out tender procedures to choose the Contractor/ Service Provider; – Works on production, supply and installation were carried out; – The Regional Center launching	Implementation of this Demonstration Project resulted in presenting real benefits from using hydrocarbon refrigeration system to enhance safety

Planning Activity (as per initial project document)	Outputs or service delivered	Outcomes observed
	ceremony was held on September 18, 2019; – Demo-project "Hydrocarbon refrigeration system for typical fruits and vegetables storages" is aimed at improvements in the field of safety, energy efficiency (by 34% on the demo-project site). – The information events were held in September 2019 for Armenian HVAC&R representatives and government officials and in December 2019 for technicians from Turkmenistan.	and energy efficiency with aim to spread replication widely.
Deliverable 5: Common curriculum is developed for providing vocational and academic studies covering refrigeration and air-conditioning service practices.	– Bidding procedures implemented to choose the Contractor/ Service Provider; – All procedures and works under the Contract were completed.	Common curriculum of the Regional Center is developed for providing vocational and academic studies.

Description of outcomes

OUTCOME 1: Center of Excellence is established and put into operation with fully equipped training and assessment facilities.

The Ministry of Nature Protection of the Republic of Armenia nominated the International Scientific-Educational Complex of "Shirakatsy Lyceum" for location and functioning of the Regional center of Excellence.



MINISTRY OF NATURE PROTECTION OF THE REPUBLIC OF ARMENIA
MINISTER
МИНИСТЕРСТВО ОХРАНЫ ПРИРОДЫ РЕСПУБЛИКИ АРМЕНИЯ
МИНИСТР

Министру природных ресурсов и экологии
Российской Федерации Трутневу С.Е. Донскому

Уважаемый Сергей Ефимович!

В ответ на Ваше письмо от 19 декабря 2017г. сообщаем, что Министерство охраны природы Республики Армении с удовлетворением приняло к сведению информацию о запуске проекта «Создание регионального центра повышения квалификации и сертификации, предназначенного для демонстрации альтернативных озонобезопасных технологий с низким потенциалом глобального потепления» в Армении и готово оказать поддержку созданию Регионального центра в Ереване, а также реализации соответствующего демонстрационного проекта.

Министерство охраны природы Республики Армении по согласованию с представителями ЮНИДО завершило выбор бенефициара для создания регионального центра, которым является Международный научно-образовательный комплекс «Лицей им. Ананиа Ширакаци», единственный в регионе полноправный член Всемирной ассоциации международных школ «Round Square», объединяющей 160 новаторских школ из 40 стран.

Одновременно сообщаем, что процесс выбора бенефициара для реализации демонстрационного проекта пока не окончен, и мы дополнительно известим о полученных результатах.

С уважением,
исполняющий обязанности

Арцвик Минасян

"Shirakatsy Lyceum" was founded in 1990 to reveal gifted children, manage their education and study their gift problems. Since October 2009 the "Shirakatsy Lyceum" has been officially recognized as a regional one, and since 2010, it has been a sound member of the World Association of International Schools «Round Square» (network of 150 innovative schools located in 40 countries on five continents). More than 300 graduates from "Shirakatsy Lyceum" continued their studies at leading world universities such as Harvard, Cambridge, Sorbonne, Oxford, Stanford, Lomonosov, Massachusetts, Tokyo, Beijing, and London universities.

The Regional center of Excellence is equipped with the following training simulators and equipment:

- CO_2-based refrigeration machine;
- HC-based refrigeration machine ("HC-based refrigeration machine" and "Retrofit to HC refrigerants");
- Training simulator "Welding and soldering. Supply and exhaust ventilation";
- Training simulator "Principles of refrigeration machine operation. Azeotropic refrigerants";
- Training simulator "Principles of refrigeration machine operation. Zeotropic refrigerants";
- Training simulator "Refrigerants. Types. Identification. Recovery and regeneration";
- Training simulator "Refrigeration machine. VRF";
- Training simulator «Refrigeration machine. Chiller & fan coil unit»;
- The furniture and office equipment have been supplied in the following scope: desks for students and a trainer, chairs for students and a trainer, desk for a trainer, lap tops, interactive whiteboard, racks for the back office, safety and warning signs, first-aid kits, consumables and tools;
- Training courses and software installed on the laptops to enable simultaneous training of 15 HVAC system specialists.

Fig. 1 Main class-room equipped with the state-of-the art training simulators

The Regional Center was launched in September 18, 2019. The launching ceremony was a part of the session of the Interstate Ecological Council of the Commonwealth of Independent States (CIS) countries. It was attended by more than 50 participants: ministers and deputy ministers of CIS countries, representatives of UNIDO, HVAC&R associations and companies, technical experts and students.

Fig. 2 Participants of the launching ceremony

Fig. 3 A ribbon-cutting ceremony

(from left: Erik Grigoryan, Minister of Environment of the Republic of Armenia, and Sergey Yastrebov, Deputy Minister of Natural Resources and Environment of the Russian Federation)

OUTCOME 2: Training and certification programs and technical advisory services of the Regional Center are developed and accredited under Real Alternatives certification system.

The Regional Center was accredited under the internationally recognized certification schemes (Real Alternatives) and accessed to the learning programs for technicians working in the refrigeration, air conditioning and heat pump sector, designed to improve skills and knowledge in safety, efficiency, reliability and containment of alternative refrigerants in English and Russian languages.

Fig. 4-6 Training process and handing of certificates

The accreditation scope of supply includes the following:

- learning booklets for individual self-study delivered as pdf downloads;

- e-learning modules that mirror the learning booklets;

- practical training course design;

- assessments and certification for individuals;

- a train the trainer programme and licensing of training providers;

- programme website.

5 trainers were trained and certified under F-gas and Real Alternatives certification systems.

The National Lead agreement was signed. The Regional Center as a National Lead will provide learners with access to the Real Alternatives materials, conduct trainings and assessment exams.

The level of equipment in the Regional Center was highly praised by the Centro Studi Galileo (Italy), which conducted the accreditation assessments with following remarks:

- The HVACR training center is very well equipped with several RAC didactical units (e.g. AC split, unit with f-gases, equipment with CO_2 and with HCs, etc). The technological relevance of the equipment is high. The disposition of the training equipment in the center allows the best task performance. There is also a vast, up-to-date and useful stock of reserve equipment, tools, and consumables.
- The five participants were motivated, very well prepared and highly skilled. They possess a remarkable theoretical knowledge and the motivation to perform the practical tasks; this allowed carrying out the training and assessments smoothly and rapidly. Many questions and comments raised by the participants allowed for a stimulating debate at the end of each session. The younger participants demonstrated a promising attitude and interest for the activity. All participants passed the three assessments with remarkable grades, higher than average.

Additionally, the Regional Center signed a special agreement on cooperation with the related Moscow training Center. So now the Regional Center can provide additional training courses for learners and grant them with safety and skills certificates (such as electrical safety, works at heights, pressure receptacles and soldering skills) valid on the territory of Russia and Eurasian Economic Union states.

OUTCOME 3: A common draft F-gas regulation harmonized with (EU) №517/2014 was developed and published as e-version in Russian and English languages for dissemination among partner countries of the Region.

The set of F-gas documents directly related to the training and certification issues were translated into Russian:

- Regulation (EU) № 517/2014 of the European Parliament and of the Council dated 16 April 2014 on fluorinated greenhouse gases and repealing Regulation (EC) № 842/2006 Text with EEA relevance;
- Commission Regulation (EC) № 1516/2007 dated 19 December 2007 establishing, pursuant to Regulation (EC) № 842/2006 of the European Parliament and of the Council, standard leakage checking requirements for stationary refrigeration, air conditioning and heat pump equipment containing certain fluorinated greenhouse gases (Text with EEA relevance);
- Commission Implementing Regulation (EU) 2015/2067 dated 17 November 2015 establishing, pursuant to Regulation (EU) № 517/2014 of the European Parliament and of the Council, minimum requirements and the conditions for mutual recognition for the certification of natural persons as regards stationary refrigeration, air conditioning and heat pump equipment, and refrigeration units of refrigerated trucks and trailers, containing fluorinated greenhouse gases and for the certification of companies as regards stationary refrigeration, air conditioning and heat pump equipment, containing fluorinated greenhouse gases (Text with EEA relevance);

These documents were taken into account when certification training courses had been developed and introduced.

The countries of the Region will consider the process of harmonization of national legislation and regulation after their ratification of the Kigali Amendment. The Regional Center is now ready to provide advisory services and technical assistance regarding implementation of needed harmonization of legislation and regulation on a request of any country of the Region. The Interstate Technical Council of National Refrigeration Associations has been established to accelerate this process.

OUTCOME 4: Demonstration Project showing utilization of low-GWP refrigerants and energy efficient design is in place and accessible for conducting study tours and analysis.

Demo-project «Hydrocarbon refrigeration system for typical fruits and vegetables storages» was implemented in Province of Kotayk, Armenia. Old-fashioned cooling system using CFC-12 as refrigerant was replaced with secondary refrigeration system using R290 (propane).

Fig. 7 Hydrocarbon refrigeration system installed in Province of Kotayk, Armenia

The new cooling system installation provided benefits in terms of safety, energy efficiency, reduction of life-cycle costs and opportunity for wide spreading replication.

Description of benefits considered while conducting study tours are as follows.

Safety

Refrigerant charge is 6 kg. Considering the fact that R290 is a highly flammable matter, the following fire safety measures have to be taken:

- all spark-hazardous electrical components are located beyond protecting casing and are installed in a separate control switchboard;
- all components installed in a protecting casing are explosion-proof;
- a protecting case has an internal alarm system with R290 leakage detector, which in case of refrigerant leakage isolates the refrigeration plant;
- new unit is installed outdoor as specified by fire safety requirements.

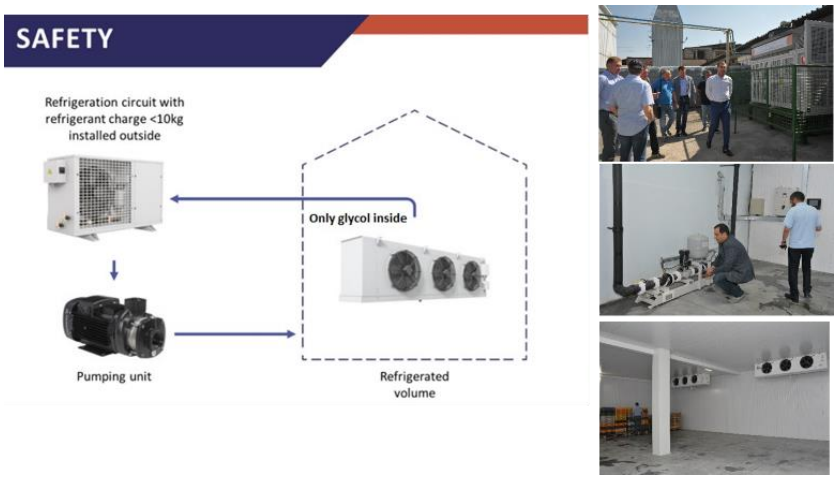
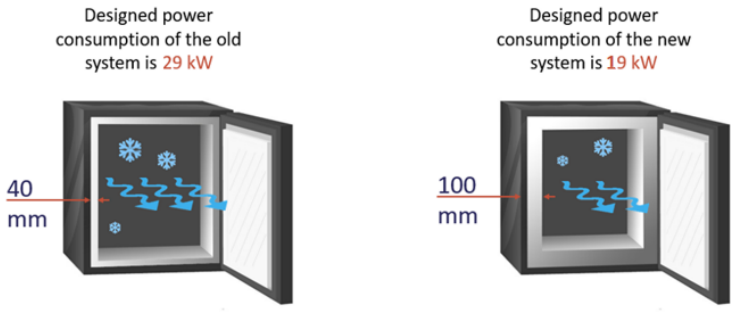


Fig. 8 Example of safety location of equipment

Energy efficiency



High energy efficiency is ensured by lower refrigeration load through enhanced heat insulation, condenser of larger size and automation system maintaining minimum condensing pressure. As result energy efficiency has improved by 34%.

Fig. 9 Comparison of energy efficiency between new and old-fashioned systems

Reduction of life-cycle costs

The life-cycle costs include initial (capital) expenditures, cost of electrical energy and repair and maintenance costs. Average operation time before overhaul is taken as 10 years.

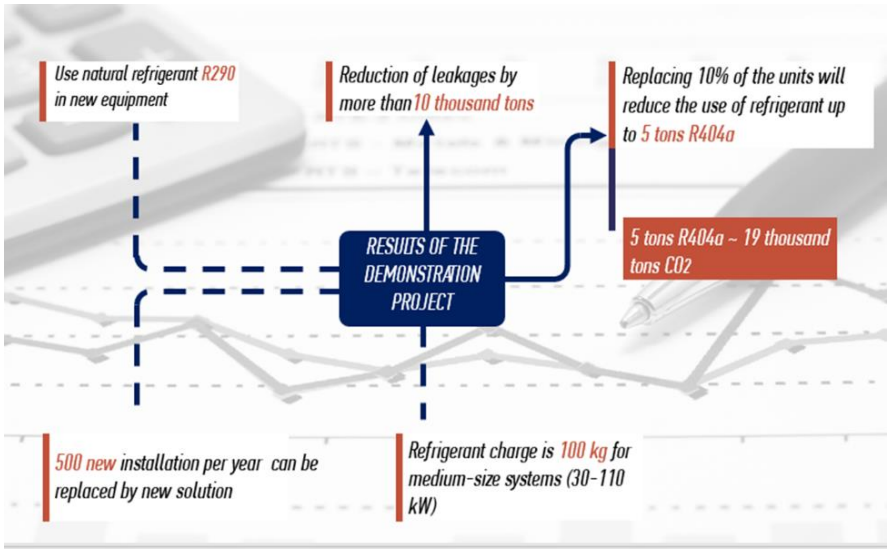
Solution	Initial expenditures, USD	Electrical energy		Repair and maintenance cost, USD/y	Total in 10 years, USD
		kWh/y	USD/y		
Old equipment*	0	52 000	9 360	112 000	213 600
R404a central system	105 000	43 545	7 838	3 000	213 381
Proposed solution	125 000	34 525	6 215	500	192 145

*Cost of operation of old equipment includes overhaul with possible purchase of R12 in future.

Fig. 10 Sample calculations and comparison of life-cycle cost

10 years later the proposed solution will enable to save USD 21,236 as compared to R404a central system and USD 21,445 as compared to the "old-fashioned" equipment.

Opportunities for wide spreading replication



This demo-project has some technological advantages: factory assembly, easy for installation, parameters are maintained without service personnel, materials are available and maintenance costs are low.
Up to 500 new installations per year can be replaced by using this solution in the countries of the Region (Eastern Europe and Central Asia).

Fig. 11 Opportunities for replication of this solution

All visitors of the Regional Center and potentially interested parties in the countries of the Region are invited to undertake site visit and see an example of successfully implemented project showing safety and energy efficiency of the proposed solution on the basis of natural refrigerants.

The system operation parameters are transmitted in real time and recorded for further analysis and studies. Thus, the Demonstration Project serves as a platform for promoting natural refrigerants solutions in the countries of the Region.

OUTCOME 5: Common curriculum was developed for providing vocational and academic studies covering refrigeration and air-conditioning service practices.

The common curriculum for vocational and academic studies covering refrigeration and air-conditioning practices is based on use of internationally recognized programs.

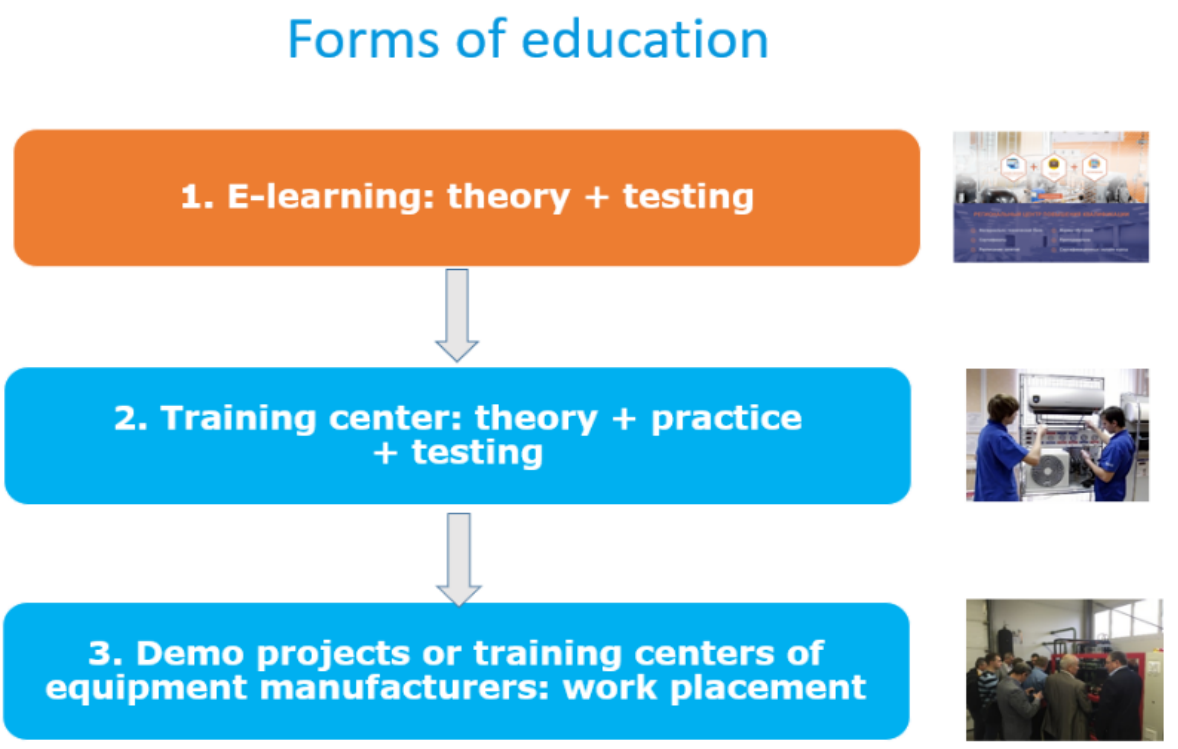


Fig. 12 A scheme used in the Regional Center for development of common curriculum

The forms of education include first e-learning: theory + testing, then coming to Armenia and in-depth study of theory, practice and testing at the Regional Center. The final process of consolidation of knowledge includes undertaking practice on site of demo-project or/and at the training centers of equipment manufacturers and partners facilities.

The Regional Center provides a wide range of training programs for different target audience given in the table below:

Title of program	Forms of education	Target audience	Trainers	Certificate
Real Alternatives learning program	E-learning on https://www.realalternatives.eu, theory, practice, assessments and certification for individuals	HVAC&R specialists	Certified Regional Center Trainers	Real Alternatives
F-gas certification course (4 category)	E-learning on hvaccenter.am, theory, practice, assessments	Technicians and other	Certified Regional	European F-gas, if

	and certification for individuals	HVAC&R specialists	Center Trainers + independent assessment procedure	necessary
Use of natural refrigerants in various sectors	E-learning on hvaccenter.am, theory, practice and advisory services	Customers and HVAC&R specialists	Certified Regional Center Trainers, Regional Center partners	Not applicable
Safe use of ammonia refrigeration systems	E-learning on hvaccenter.am, theory, practice at Regional Center and advisory services	Customers and HVAC&R specialists	Certified Regional Center Trainers, Regional Center partners	Not applicable
Safe use of hydrocarbon refrigeration systems	E-learning on hvaccenter.am, theory, practice at Regional Center and demo-project and advisory services	Customers and HVAC&R specialists	Certified Regional Center Trainers, Regional Center partners	Not applicable
Safe use of carbon dioxide (CO_2) refrigeration systems	E-learning on hvaccenter.am, theory, practice at Regional Center and demo-project and advisory services	Customers and HVAC&R specialists	Certified Regional Center Trainers, Regional Center partners	Not applicable
Ozone layer protection and climate change legislation	E-learning on hvaccenter.am, theory, practice at Regional Center	Customers, government officials and HVAC&R specialists	Certified Regional Center Trainers, NOU experts	Not applicable
Design and operation of carbon dioxide (CO_2) refrigeration systems	Theory and practice at Regional Center	Customers and HVAC&R specialists	Regional Center partners	Not applicable
Danfoss training courses: 1) Refrigeration fundamentals 2) Danfoss compressors 3) Danfoss automation systems 4) Industrial refrigeration 5) Commercial refrigeration	Theory and practice at Regional Center	HVAC&R specialists	Regional Center partners	Danfoss certificates

The training package includes:

- Curriculum of training courses;
- Online training course;
- Training manual;

- Training presentations for theoretical classes of the course;
- Practical training course design;
- Assessments and certification for individuals (where applicable).

Gender issues

The equal rights of women and men were provided through the whole project cycle.

A key role in the project implementation was played by UNIDO Country Representative and Head of Ozone office, National Ozone Focal Point for Armenia.

The percentage of women-managers in the beneficiary institution has increased to 50% and it is higher than in average in an ordinary organization in Armenia.

The Regional Center ensures equal rights and equal access to its services for women and men. It encourages women's participation in trainings by popularizing women in Trades and Technology together with the Regional Ozone Network for A 5 Countries in the Region of Eastern Europe and Central Asia.

PR activities and cooperation with other projects

The PR activities of the project included arrangement of special events, participation in relevant meetings and information dissemination.

The Project participants repeatedly discussed issues related to development of the Regional Center of excellence at the meetings of Ozone Officers Network for the region of Eastern Europe, Caucasus and Central Asia and community events held in Moldova, Georgia, Belorussia and Turkey in 2017-2018. The issues related to the Regional center of excellence vision and training programs under development, as well as the unified concept of the regional certification system were under discussion.

Representatives of refrigeration associations and working groups also met in Moscow (more information can be found on website: http://www.ozoneprogram.ru/eng/news/refrigeration_associations_in_moscow/) to discuss among other issues the development of a regional certification structure and certification concept.

The Project participants held numerous meetings with representatives of the Ministry of Nature Protection of the Republic of Armenia, project`s beneficiaries, local stakeholders and Armenian RAC Association.

The Interim Project report was submitted for consideration at a workshop on activities of the Russian Federation in area of International Development held at the Russian Embassy in Yerevan on January 30, 2019.

The launching ceremony was a very important PR-event and organized as a part of the session of the Interstate Ecological Council of the Commonwealth of Independent States (CIS). It was the important event for Armenia, Russia and other CIS countries and was widely covered by mass media including TV and governmental and HVAC association websites, e.g.:

- http://www.mnr.gov.ru/press/news/v_armenii_po_initsiative_i_pri_finansovoy_podderzhke_rf_otkrylsya_regionalnyy_tsentr_povysheniya_kva/
- http://www.mnp.am/en/post/4185
- https://www.youtube.com/watch?t=4s&v=3lE3M1tEfdY&app=desktop
- http://www.rshp.ru/index.php?option=com_content&view=article&id=673:2019-09-25-04-15-51&catid=62:2009-08-28-05-54-21&Itemid=2
- https://armenpress.am/arm/amp/988505
- https://news.am/arm/news/534091.html
- https://168.am/2019/09/18/1175278.html
- https://enews.am/news/5d821d110a975a6f105e8c84
- https://www.tert.am/am/news/2019/09/18/mnp/3096706
- https://assets.danfoss.com/documents/DOC320841040091/DOC320841040091.pdf (page 10)

The Regional Center was also presented at Europe and Central Asia (ECA) network meeting held in Kiev on 24-25 September, 2019.

Project implementation delays

The project was approved in May 2016. The implementation period was expected to be 36 months after the project approval therefore it should have been completed by June 2019. But funds were allocated to the Implementing Agency (UNIDO) in September 2017. So actually financing of the Project activity was commenced with delay of one year. Therefore December 2019 can be considered as early estimated completion of the Project (36 months will expire in September 2020). It means the project is completed faster than planned.

Other factors causing minor delays of the Project commencement and accomplishment are as follows: delays in defining beneficiaries for the Regional Center of Excellence (till 23.04.2018) and in implementation of the Demonstration project (till 18.07.2018) were caused on the host side (Ministry of Nature Protection of the Republic of Armenia), mostly due to replacement of beneficiary for the Demonstration project (till 02.11.2018), resulting in rescheduling of bidding procedures terms and bidding tasks adjustment.

Long-lasted repair works in the premises of the Regional Center were carried out by the beneficiary to prepare the required classrooms and make installation of training stands (all works were competed only in February 2019). These delays were caused mostly due to some political reforms and decision maker replacements in the Republic of Armenia.

Project sustainability evidence

Development concept

The Development concept for the Regional Center provides its management with important information on the educational market in the countries of the Region, the promising directions of development of the Regional Center, its partners, training programs, potential customers, pricing, staff and other important issues. The development concept was under discussion as one of key issues with the Regional Center management.

Governmental support and official partners

The Regional Center is supported by the Ministry of Environment of the Republic of Armenia and the National Ozone Unit of the Republic of Armenia. The Regional Center has five partners and cooperation with them on the basis of signed partnership agreements as follows:

- The Danfoss Group manufactures products and provides services used in cooling food, air conditioning, heating buildings, variable frequency drives, gas compressors and powering mobile machinery.

- NORD is a Russian manufacturer of CO_2 and Hydrocarbons systems.

- Rossoyuzkholodprom is a Russian HVAC association working closely with the Russian government.

- Vercont-service is a Russian HVAC training-center, established with technical assistance of UNIDO. It works successfully without governmental support, that is important for success in exchange of experience.

- IMEI helps the Regional Center to get safety certificates valid on the territory of Russia and other Eurasian Economic Union states.

The Center provides an open platform for potential partners to contribute to operation of the Regional Center in return to fair exposure of their goods and services and testing and demonstration of products and systems. They are also interested in supporting the HVAC sector globally and fostering research activities, including practical application of testing results (environmentally-safe techniques of handling refrigerants), energy-efficiency performance, and many other issues incorporated into certified academic programs.

Trainings held in the Regional Center

A few trainings have been conducted since the establishment of the Regional Center.

The first training event for trainers started immediately after the launching ceremony. Five trainers were trained and certified under F-gas and Real Alternatives (CO_2, HC) program.

Fig. 13 Training process

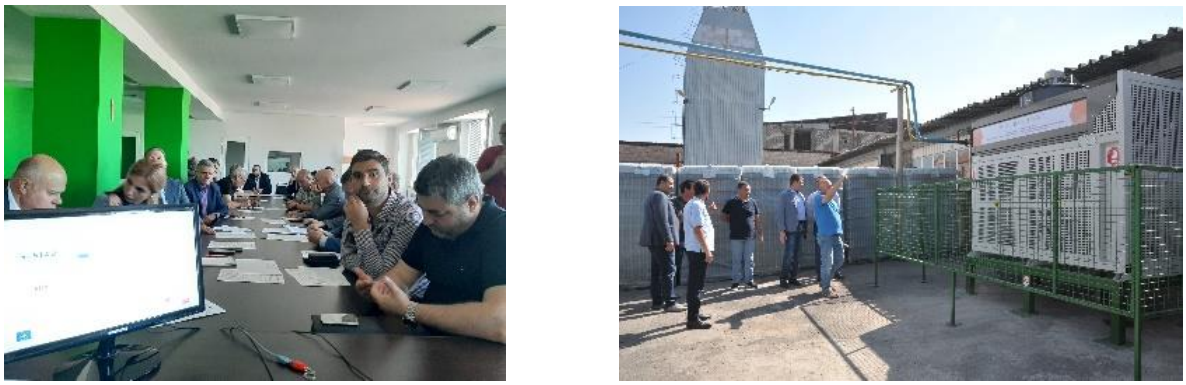


Fig. 14 Training course in class and on site

The second training course was held with the partners of the Center. It was dedicated to its development and the demo-project key features. More than 30 participants, including partners of the Regional Center, HVAC specialists and Regional Center representatives attended the second training event.

The third training event was carried out in October 2019 immediately after the Prom Expo exhibition held in Yerevan, with assistance of Danfoss company (official partner of the Regional Center). A group of 17 participants represented HVAC&R specialists and trainers from Armenian technical colleges and universities.

Fig. 15 Course leavers with certificates handed

The fourth training course was held in November and December 2019 for technicians from Turkmenistan in amount of 15 participants. They received Regional Centre certificates and safety certificates valid on the territory of CIS countries (electrical safety, work at heights, pressure receptacles, soldering).

Fig. 16 A group of course leavers from Turkmenistan with certificates handed

The fifth training course was carried out in December 2019 for Armenian technicians in amount of 15 participants representing Armenian RAC. All of them received Real Alternatives certificates.

Fig. 17 Training process in a classroom

As result of the Regional Centre activity it was contracted in the end of 2019 to conduct training courses in early 2020 for minimum 45 technicians representing the countries of the Region of Eastern Europe and Central Asia.

Initiation of F-gas certification for participants from the countries of the Region

The Interstate Ecological Council of the Commonwealth of Independent States (CIS) addressed this issue of F-gas certification for the countries of the Region at its session in Yerevan in September 2019. The states of the Region which are not yet a Party of the Kigali amendment to the Montreal Protocol including the Russian Federation will initiate F-gas certification after ratification of the Kigali Amendment.

Recommendations

- Additional funds to be allocated to continue and develop the Project success and enable the countries of the Region to direct their technicians to the Regional center in Yerevan for certified training

The original Project budget was proposed by the Russian Federation in amount of USD 852,600 excluding 13 % of Agency Support Costs. The budget was expected to cover expenses for both development of the Regional center and further conducting training and certification of expected and considerable number of technicians from the countries of the Region.

The originally proposed budget of the Project was reduced more than by 30 % and the budget approved amounted to USD 591,600 excluding 13% Agency Support Costs. Nevertheless the main tasks of the Project have been performed but substantial reducing of the budget resulted in considerable cutting-down of total number of trained technicians representing the countries of the Region.

Therefore the Russian Federation suggests that some needed additional funds to be allocated to complete the Project component related to enabling the countries of the Region to direct their technicians to the Regional center in Yerevan. The funds can be allocated as Phase 2 of the Project and covered from the Russian Federation contribution to MLF for 2020 paid and wired in full amount of USD 7,782,333.00 in December 2019.

- Customers training is a key target

The refrigeration systems owners and potential customers are real decision-makers on the local markets. They make a final decision what to "buy" and "which system to install". It is strongly recommended to concentrate efforts on customers training in similar future projects implementation.

- Commencing Project implementation shall be provided by timely allocation of funding in order to avoid any delays

The Project implementation period should be determined from a moment of receiving sufficient funds by Implementing Agency.

- Country situation assessment shall be a subject of proper investigation

There is a need in more proper assessment of the country situation. For example, a lack of vocational schools and universities, qualified specialists, co-financing sources as well as temporary political instability in Armenia at the period of implementation of the Project (obviously this factor cannot be predicted or expected) can result in delays in the schedule of implementation.