



Co-funded by the
Erasmus+ Programme
of the European Union



Integrating education with consumer behaviour relevant to energy efficiency and climate change at the Universities of Russia, Sri Lanka and Bangladesh (BECK)

Partner report on current state of higher education and its relationship with consumers' behaviour on energy efficiency and climate change

Report prepared by: *MGSU, ASV, Russia*



1	Introduction	3
2	Methodology.....	4
3	Context	5
3.1	Socio-political and cultural context.....	5
3.2	Status of education	6
3.3	Funding.....	8
3.4	Educational needs	8
3.5	Educational gaps.....	8
4	Policies relevant to higher education, and their relationship with consumer behaviour on energy efficiency and climate change	10
4.1	Policy and planning	10
4.2	Gaps in policy and planning	10
5	Capacity types	12
5.1	Institutional capacities	12
5.2	Organisational capacities	15
5.3	Individual capacities: Staff skills.....	18
5.4	Access to Information, Knowledge and Technology	21



1 INTRODUCTION

The purpose of this series of country reports is to obtain general philosophical, pedagogical and practical understanding on the status of higher education and its impact on consumer behaviour relevant to energy efficiency and climate change in BECK partner and European partner countries. It will also provide a basis for understanding and evaluating the capabilities of partner institutions on integrated education for energy efficiency and climate change. The results of these reports will inform a capacity building framework, which will form the basis for development of modules on energy efficiency and climate change during the BECK project.

The reporting approach is based on the Capacity Needs Assessment Methodology (CAPNAM) proposed by the United Nations (2013).

The report includes chapters on the following:

- Methodology. This section describes the methodological approach used to collect and analyse the data that informs the findings presented in this report.
- Context. Provides an overview of the regulatory, socio-political, and cultural factors that shape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and education in particular.
- Scope and coverage of education policies on consumer behaviour relevant to energy efficiency and climate change by the Higher Education Institution (HEI). Examines the illustrative policy and planning issues relevant to integrated education on consumer behaviour relevant to energy efficiency and climate change.
- Description of capacity types. Evaluates the existing state of capacities of HEI in the field of integrated education on consumer behaviour relevant to energy efficiency and climate change. As defined by the CAPNAM analytical framework, the four types of categories are institutional, organisational, individual, and the knowledge base.

The content of this report is related to the BECK Project and reflects only the author's view. The National Agency and the Commission are not responsible for any use that may be made of the information it contains.



2 Methodology

Please describe the methodological approach used to collect and analyse the data that informs the findings presented in this report. For example, this may include focus groups, interviews, document reviews and literature reviews.

For the preparation of materials, the following methods were used: analysis of documents, review of literature, interviews with heads of departments, leading teachers and staff of the Educational and Methodological Department of MGSU and ASV members and staff.



3 CONTEXT

This section provides an overview of the regulatory, socio-political, and cultural factors that shape policy on the consumer behaviour relevant to energy efficiency and climate change in the country in general, and the education in particular. Please answer following questions.

3.1 Socio-political and cultural context

What are the socio-political and cultural contexts providing the framework for educational policy planning in the field of consumer behaviour relevant to energy efficiency and climate change in the country? Are there any regulations, plans, etc.?

Energy efficiency and energy saving are included in the five strategic areas of Russia's priority technological development. Currently, there are several legislative acts that determine the policy of the state in the field of efficiency:

- Federal law dated 03.12.2011 No. 382-FZ (ed. from 05.07.2018) "On state information system of fuel and energy complex" (Rev. and EXT., joined. in force from 01.01.2019)
- GOST R 53905-2010. National standard of the Russian Federation. Energy saving. Terms and definitions (approved. and promulgated by the Order of Rosstandart on 09.11.2010 No. 350-St) (ed. by 18.09.2018)
- On November 23, 2009, Federal Law No. 261-FZ "About Energy Saving and Improving Energy Efficiency" was approved. The law provides the information support of measures on energy saving and energy efficiency.
- On the basis of this law, in January 2011, the State Program of the Russian Federation "On Energy Saving and Improving Energy Efficiency for the Period up to 2020 and on Amendments to Certain Legislative Acts of the Russian Federation" was developed, N 2446-r. The program is aimed at shaping an energy efficient society in Russia, increasing the level and quality of life of the population through realizing the potential of energy saving and increasing energy efficiency based on modernization, technological development and the transition to a rational and environmentally responsible use of energy resources. According to the State Program, in the period from 2011 to 2020, at least 450 thousand specialists responsible for energy saving and energy efficiency in federal and regional executive authorities, organizations with the participation of the state and municipal entities and other organizations and institutions should undergo training.
- In the framework of the State Program, the Subprogramme "Methodological, Informational and Personnel Support of Energy Saving and Energy Efficiency Measures" was adopted. In particular, "promoting the formation of a lean model of behavior of the population, including the creation of a set of tools for informing citizens about possible typical solutions for energy saving and energy efficiency". "The promotion of a lean model of population behavior is aimed at stimulating positive public opinion about the need for energy saving and energy efficiency. This goal will be achieved through a set of activities for various target groups."
- Energy efficiency is one of the tools for reducing greenhouse gas emissions and combating climate change. This is especially true for Russia, which has significant potential for improving energy efficiency. Therefore, energy efficiency should be a central element of a country's climate policy. The Russian economy is characterized by



a high level of energy intensity, which is 2–3 times higher compared to OECD countries (IEA data). The reason for this is low energy efficiency in most sectors of the economy. According to the World Bank, residential buildings, power generation and industry have the greatest technical potential for improving energy efficiency. Accordingly, one of the necessary measures: the introduction of mandatory energy efficiency standards for buildings. The policy for improving energy efficiency is reflected in the State Program of the Russian Federation "Energy Efficiency and Energy Development", approved by the Government of the Russian Federation dated 04.15.2014 No. 321

- On July 19, 2018, Federal Law No. 221-FZ "On Amendments to the Federal Law" On Energy Saving and Improving Energy Efficiency and Amending Certain Legislative Acts of the Russian Federation" was approved. This document made some clarifications in accordance with the current situation in the world and in the industry.
- Also, the country develops and approves green construction standards, which are aimed at improving the quality of the environment.
- The town-planning Code of the Russian Federation and strategy of spatial development of the Russian Federation define sustainable development of territories of the country as the main direction of town-planning. As part of this approach, the introduction of energy efficiency technologies at all stages of the life cycle of the urban facility becomes one of the most urgent. Everyone understands that the introduction of energy-efficient technologies is a very urgent agenda on which the climate of the planet depends.

There are a number of socio-economic problems that hinder the development of this topic:

- The high cost of technology that is not available to its users
- Low level of users' knowledge about technologies.

In this aspect, the development of education in this area becomes the main direction for the introduction of these technologies in life. It is necessary to implement an interdisciplinary approach at the junction of urban planning, operation of urban infrastructure, engineers of energy-efficient technologies. The introduction of these technologies is necessary from the first stage of planning and design of the urban environment – the formation of urban strategies of energy-efficient sustainable city, selection of space-planning solutions and, further, the introduction of technologies in urban processes.

3.2 Status of education

What is the current state in education on consumer behaviour relevant to energy efficiency and climate change? Is it important at your country? Please specify.

To implement the subprogramme, the Federal 24/7 hotline on energy saving and energy efficiency has been launched since 2011, in 2012 was transformed into a Contact Center. The objectives of the hotline are:

- increasing the confidence of the Russian population in the state initiative for energy conservation;



- informing users about the principles and importance of energy saving and energy efficiency and about existing technologies and methods to reduce energy consumption;
- public motivation to apply energy saving and energy efficiency measures;
- increasing the society's knowledge of energy.

The Center for Comprehensive Energy Efficiency and Energy Saving of the Ministry of Science and Higher Education (www.energoeducation.ru), conducts training and monitoring the implementation of legislation in the field of energy efficiency, and implements effective energy management systems.

In the period from 2013 to 2014 within the framework of networking with regional universities, the Ministry of Energy of the Russian Federation implemented a large-scale educational project in the field of energy saving and energy efficiency to improve the skills of personnel. The project trained about 20 thousand professionals, public sector work staff throughout the Russian Federation.

A similar project was initiated in the framework of the United Nations Development Program (UNDP) Project and the Global Environment Facility (GEF) "Energy Efficiency of Buildings in North-West Russia".

In order to form a lean model of behavior among the population of the Russian Federation, activities are being carried out to develop educational materials and to train according to the developed programs. To ensure the fulfillment of the objectives of these projects, a network of Integrated Training Centers in the field of energy efficiency is used. These centers have been established in all federal districts of the Russian Federation on the basis of leading universities subordinated to the Ministry of Science and Higher Education of Russia.

Currently, at the national and regional level, projects are being implemented to promote energy conservation and energy efficiency. For example, the Energy Efficient Russia website of the National Union of Energy Conservation (www.energy2020.ru) provides information on the results of the work of the working group of the Council of the Federation on monitoring the use of 261-FZ, on recent changes in energy efficiency legislation, on the most successful energy saving projects in various areas and energy efficiency of various facilities.

On the website of the State Information System in the field of energy saving and energy efficiency (<http://gisee.ru/>) the sections "For the public", "Budget organizations", "Business", "Housing and public utilities and construction", "Energy Audit", "Energoservice", "Education", "Children", etc., where you can find various useful information for the specified groups of users of the information portal.



3.3 Funding

Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at your country? Please specify.

- Insufficient level of budget financing of the state program as a whole, and, as a result, subprogramme activities.
- Lack of university budget funding for research and development in the field of energy saving and energy efficiency.

3.4 Educational needs

What are the needs in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major needs at country level):

Despite the multitude of adopted programs and subprograms, the organization of training for responsible for using energy resources in energy-efficient models, and population in energy-efficient behavior, is absolutely not enough for the scale and size of Russia.

It seems that a significant expansion and deepening of educational programs is needed, covering various categories of students:

- Learning the basics of environmental and energy culture should be end-to-end, starting from kindergartens (through specially designed courses, aids and games).
- In schools, instruction should be integrated in separate blocks and included in the GEF subjects.
- In higher education institutions, the problems of energy-efficient and climate-friendly behavior should be taught in separate disciplines, or integrated in existing subjects, depending on the specialization of students. In higher education institutions, regardless of their profile, it is possible to provide for compulsory teaching of the basics of energy efficiency as part of a course on the basics of environmental knowledge.

It is necessary to open in higher educational institutions a new area of education for the training of specialists with competences for training employees of various institutions, enterprises, organizations and residents of localities.

To improve the skills of state and municipal employees, workers of industrial enterprises, housing and public utilities and other sectors of the economy, create separate regional training centers, or ensure the development of this area of training in existing regional centers to form competences in energy efficiency.

3.5 Educational gaps

What are the gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to 5 major gaps at country level):

Non-systemic and inorganic nature of the state and regional policies pursued, lack of objective primary information on energy consumption and losses, limited information on the real, rather than advertising, assessment of the energy efficiency of various devices, technologies and equipment, as a result - a wrong understanding of local workers in this field and residents of the



causes and mechanisms of what is happening; unreasonable and fragmentary decisions without calculating the result; lack of institutional and management coordination.

“Expensive” mass energy efficiency projects are becoming economically unreasonable and uninteresting for various categories of energy consumers;

Lack of motivation of both workers and residents for energy-saving behavior and energy efficiency, lack of awareness and confidence in the need and “security” of applying measures and mechanisms for business, the public sector, citizens. Lack of work organized at the regional and local level to disseminate knowledge about energy-saving technologies, exchange experience in introducing new materials, devices and technologies;

Lack of qualified specialists in energy efficiency (technological, engineering, financial, administrative; in the administrations of cities and districts, subjects of the Federation, in business, banking and financial sectors, etc.). Low level of education in the field of energy saving. Lack of qualifications is one of the major barriers to mass implementation of energy efficiency projects.

The lack of a general system of propaganda of energy-saving behavior; insufficient use of the media to promote the benefits of energy-saving business style; limited use of Internet technologies.



4 POLICIES RELEVANT TO HIGHER EDUCATION, AND THEIR RELATIONSHIP WITH CONSUMER BEHAVIOUR ON ENERGY EFFICIENCY AND CLIMATE CHANGE

This section examines the illustrative policy and planning issues relevant to integrated education on consumer behaviour relevant to energy efficiency and climate change. Please answer following questions.

4.1 Policy and planning

Please describe policy and planning issues currently being addressed by the HEI in the field of integrated education on consumer behaviour relevant to energy efficiency and climate change.

Currently, energy efficiency specialists are trained in the frames of 23 programs (13 undergraduate programs, 10 graduate programs) in 30 Russian universities. Specialists in energy efficiency and rational use of energy resources are trained in the fields of the ecology, chemistry, civil engineering, heat supply engineering, housing and communal services, technical and informational support of energy-efficient power sources. The programs cover all applied (!) issues related to energy efficiency and are aimed at solving basic engineering, technical and technological problems announced in official documents at the national level.

According to the existing state policy, energy saving is an urgent task for the development of the state. MGSU develops and carries out educational programs in the field of energy conservation at the undergraduate, graduate and postgraduate levels. In particular, the Institute of Environmental Engineering and Mechanization (IIESM MGSU) at the Department of Heat and Gas Supply and Ventilation is implementing MSc program "Energy Saving and Energy Efficiency in Buildings" where complexity is formed when considering a building and its engineering systems in terms of energy saving. The program was developed with the support of TEMPUS project MAPREE (2012-2015). The development and improvement of this program continues.

In MGSU there are no separate subjects for studying climate change processes and their consequences for the ecology and economy of the country.

Nevertheless, within the framework of many construction and public disciplines, such questions are constantly being raised. For example:

- within the framework of general sociology in the themes: Sociology of a city and urban planning ", " Social changes in the modern world ". Discipline is taught to students of specialty, studying in the direction of "Construction of unique buildings and structures";
- in the framework of "Sociology of urban planning" - in the topics "Socio-ecology of urban planning activities", "Formation of the infrastructure of the city". Discipline is taught for students studying in the direction of "Urban Planning";
- under the "Sociology of Space and Architecture" - in the subject "Sustainable Architecture: Social Aspects". Discipline is taught to students studying in the direction of "Architecture", "Restoration and reconstruction of the architectural heritage"



4.2 Gaps in policy and planning

Please describe other, if any, policy issues that are not currently being handled by the HEI but should be considered.

Issues of energy efficiency policies that are now poorly represented in the training courses include:

- Social aspects of consumer behavior management. The question is how to introduce these technologies at the level of self-awareness of the population for the widespread dissemination of their use. Determination of mechanisms and models of management of population behavior
- Urban planning aspects of the introduction of energy efficient technologies in the urban public environment, and not only in private households or for pinpoint construction projects, as it is now.
- Global environmental aspects related to the study of climate change and the impact of energy efficient technologies on the sustainable development of territories.

In the field of Russian higher education, there is a period of change in state educational standards. Currently, a new standard is being introduced (FGOS3++). As part of the modernization of higher education in accordance with new global and regional challenges, there may be some difficulties and losses. In particular, those subjects that could strengthen education within the framework of the project under consideration are being eliminated. Sociological (behavioral) disciplines that directly study consumer behavior are eliminated at the university. In the teaching of public disciplines according to the requirements of educational standards, the emphasis in new curricula is placed on various aspects of organizational behavior, social interaction within the group, the formation of team building and leadership skills. There is no way out of the ongoing social processes associated with climate change and the study of the social behavior of the inhabitants of cities and settlements in the newly introduced disciplines.

The leadership of the university is subject to the requirements of the state standard, the work programs of the disciplines must strictly comply with the competencies that are set for each area of study.

In this regard, the introduction of those training modules that will be developed under the BECK program is extremely valuable for MGSU and other construction universities.

As a suggestion: make a cross-introduction of the developed modules in the BECK partner universities, or the departure of teachers to universities for teaching the module, or using electronic information technologies.

N.B. The responses to these questions do NOT require describing each policy and planning issue but only the identification of the type of issues being addressed and those not being addressed. The questions are only meant to understand the scope of coverage of important issues by the HEI.



5 CAPACITY TYPES

This section aims at assessment of the existing state of capacities in the HEI for integrated education on consumer behaviour relevant to energy efficiency and climate change. As defined by the CAPNAM analytical framework, the four types of categories are institutional, organizational, individual, and the knowledge base.

5.1 Institutional capacities

This part describes the institutional capacities at HEI level. Please answer following questions.

1. Please provide brief presentation of the HEI.

The Moscow State University of Civil Engineering (MGSU) is one of the top universities in the field of construction science and building technology in the CIS countries. It is committed to high quality in research and teaching, interdisciplinary education and the active promotion of promising young specialists and scientists. MGSU has a dynamically developing scientific and innovative infrastructure. MGSU was one of the first universities in Russia to be named a National State Research University and covers priorities of the National Research University for Building and Architecture and a number of priorities for the development of science, technology and engineering in the Russian Federation.

MGSU's scientific and innovative areas cover theoretical and experimental studies of global, regional and local importance with priority areas like "Industry of Nano-systems and Nano-materials", "Emergency hazardous processes in the construction industry", "Climate Saving Habitat Design", "Construction Material Sciences", "Information and Roboting systems", "Construction management", "Environmental management", "Energy and Energy Saving", "High technology in construction and architecture", "Sustainable building and Urban design" and others.

The university is developing strong links with companies and scientific institutions across the CIS countries and worldwide. It is coordinating scientific research of the university sector of engineering science in the CIS countries through the International Association of Building Universities (IABU). Presently, more than 150 Russian universities and faculties became this Association's members as well as those from the Commonwealth of Independent States (CIS).

MGSU's scientific and innovative infrastructure is a well-organized system of cooperation with strategic partners, involving federal and regional construction complexes, real sector enterprises and it covers all spheres of the University activities. Many MGSU's scientists are winners of grants established by the President of the Russian Federation, Russian Federal Property Fund and other international funds.

2. Please describe general model of studies according to different levels (bachelor, master, PhD).

According to Bologna System MGSU provides BSc programs (4-5 years), MSc programs (2 years), PhD programs (3-4 years). Beside of Bologna System there are 2 Specialist degree programs (5 and 6 years).

3. Please provide key facts and figures about the HEI:

3.1. Number of students: 11548

3.2. Number of academic staff: 867

3.3. Student/Academic staff ratio: 13,3



3.4. Number of Faculties (please specify): 6 (Institute of Construction and Architecture with its 10 departments, Institute of Hydraulic Engineering and Power Plant Construction with its 4 departments, Institute of Environmental Engineering and Mechanization with its 5 departments, Institute of Economics, Management and Information Systems in Construction and Real Estate with its 5 departments, Institute of Basic Education with its 7 departments, Institution of Distant Education)

3.5. Number of graduates: 135 000

3.6. Number of study programmes: 75

3.7. Number of international academic partners: 92

3.8. International rankings of the HEI (if any):

GreenMetric Rankings by University of Indonesia (519/719)

QS BRICKS Rankings (199)

QS EECA University Rankings (201-250)

4. Please describe main education and research areas of the HEI.

All aspects of Construction Industry: Architecture, Urban Planning, Design of buildings and the systems, Processes in Building Life Cycle. Humanitarian and economic aspects of construction industry.

5. Is there any strategic priorities given to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI level? Please specify.

NO

6. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

- Increasing the interdepartmental cooperation in education and research
- Set the new research subjects for University
- Open of new educational courses for Russian and foreign students
- Development of new competencies among students within existing courses

The curricula and work programs of disciplines for students enrolled in the following areas: "Construction", "Urban Planning", "Architecture" should include either individual subjects or topics in the taught disciplines, highlighting the state of climate change on the planet and the consequences on the territory Russia.

In curricula and training programs, behavioral disciplines should be maintained for integrated training in consumer behavior related to energy efficiency and climate change.

Such disciplines can be taught as compulsory disciplines, or as electives in certain areas of study.

7. What are the gaps at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major gaps):

In the educational programs of MGSU there are no separate subjects for studying climate change processes and their consequences for the ecology and economy of the country. The collaboration between departments of MGSU is not held on this subject.



Co-funded by the
Erasmus+ Programme
of the European Union



5.2 Organisational capacities

This part describes the organisational capacities pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. Is integrated education on consumer behaviour relevant to energy efficiency and climate change sufficiently included in the curricula of HEI? Please specify according to different levels (bachelor, master, PhD):

1.1. Study programme level (Please list relevant study programmes):

At the undergraduate level, the program on the profile Heat and Gas Supply and Ventilation includes issues of energy saving in all engineering systems that form the microclimate in buildings for various purposes, as well as in heat supply systems, gas supply systems and boiler plants. Issues of energy efficiency and climate change, taking into account consumer behavior, are not considered, since there is no methodical and scientifically based calculation method for this. Consumer behavior in energy saving is considered only in the course "Building Thermal Physics and Microclimate of Buildings" for the cold period of the year, and for the warm period with hot decades, such questions are not considered, since there are no regulations and scientific research in this area.

At the MSc level, there is the Energy Saving and Energy Efficiency in Buildings program, which deals with energy conservation, partly energy efficiency and climate without climate change, as there are no norms and studies on climate change. Consumer behavior in energy saving during the formation of thermal protection of a building is considered, and in other systems that form a microclimate in buildings and in heat and gas supply systems of cities and towns, is not considered, since there are no regulations on energy efficiency and climate change.

At the postgraduate level in the specialty Heat supply, ventilation, air conditioning, gas supply and lighting, much attention is paid to energy conservation and partly energy efficiency, and research is constantly being conducted, but research is not devoted to consumer behavior issues related to energy efficiency and climate change.

- Study programme level – Bachelor programme 08.03.01 – Construction, direction: HVAC
- Study programme level – Master's program 08.04.01 Construction, direction HVAC
- Study programme level – Master's program 08.04.01 Construction, direction Energy Saving and Energy Efficiency in Buildings
- Study programme level – PhD programme 08.06.01 – Engineering and Construction Technologies, direction HVAC and lightning

- Study programme level – Bachelor programme 07.03.04 – Urban planning
- Study programme level – Master's program 07.04.04 Urban Spatial development
- Study programme level – Semester master's program "Sustainable urban design" (in English)
- Study programme level – PhD programme 07.06.01 – Architecture and Urban planning

1.2. Study subject level (Please list relevant study subjects/modules):

HVAC:



- Building climatology.
- Building thermal physics and microclimate of buildings.
- Heating.
- Heat supply and heat generators.
- Design of heat and gas supply systems.
- Ventilation.
- Air conditioning cold supply of buildings.
- Equipment for ventilation systems.
- Energy saving and energy efficiency in buildings.

Urban Planning:

- Sustainable urban design
- Sustainable urban design
- Engineering support of urban territories
- Green buildings
- Sustainable urban energy efficiency
- Methodology of urban studies

1.3. Study topic level (Please list relevant study topics):

HVAC:

The subject of research are:

- building with thermal protection,
- building engineering systems that form the microclimate,
- heating systems,
- gas supply systems,
- heat generating installations.

Approximate research topics:

- energy saving when creating thermal protection of a building,
- energy saving in heating systems of the building,
- energy saving in building ventilation systems,
- energy saving in air conditioning systems of the building,
- energy saving in the heat supply system,
- energy saving in the gas supply system,
- energy saving in heat generating installations

Urban Planning:

- Aims and goals of sustainable development according to RIO+
- Energy efficiency in urban design
- Energy efficiency approaches in urban planning
- Energy efficient technologies
- International sustainable standards (LEED, BREEAM, DGNB)
- Structural and material issues of sustainable building design
- Architectural issues of sustainable building design
- Active and passive sustainable design
- Sustainable engineering infrastructure
- Sustainable building envelope and facades design



- Innovative design and building technology

2. Is funding sufficient for integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI? Please specify.

There is no specialized funding for integrated training in consumer behavior in the field of energy efficiency and climate change in Russian universities.

3. What are the needs at HEI in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organisation of study process (please list up to five major needs):

- The curricula and work programs of disciplines for students enrolled in the following areas: "Construction", "Urban Planning", "Architect" should include either individual subjects or topics in the taught disciplines, highlighting the state of climate change on the planet and the consequences on the territory Russia.
- In curricula and training programs, behavioral disciplines should be maintained for integrated training in consumer behavior related to energy efficiency and climate change.
- Such disciplines can be taught as compulsory disciplines, or as electives in certain areas of study.

6. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to organisation of study process:

MGSU does not have a separate scientific direction on climate change and does not conduct specialized scientific research on this topic.

In the educational programs of MGSU there are no separate subjects for studying climate change processes and their consequences for the ecology and economy of the country. The collaboration between departments of MGSU is not held on this subject.



5.3 Individual capacities: Staff skills

This part describes the individual staff capacities pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change at HEI. Please answer following questions.

1. How many academic staff works at your unit? (which implements the project):

HVAC – 37

SPPK - 20

Urban Planning – 24

2. Is there sufficient number of teachers who specialise in integrated education on consumer behaviour relevant to energy efficiency and climate change? How many?

2.1. At university level: only energy efficiency - 40

2.2. At your unit/department: only energy efficiency

3. Is there sufficient number of researchers who specialise in consumer behaviour relevant to energy efficiency and climate change? How many?

3.1. At university level: only energy efficiency - 30

3.2. At your unit/department: only energy efficiency

4. Please describe the current state of the staff training in HEI. Is it sufficient?

According to the decisions of the Ministry of Science and Education of the Russian Federation in Russia, periodic training of teachers is required. All teachers are required to improve their skills in the subject being taught, both in general and in individual problems. Teachers undergo advanced training in other universities and their own, receive certificates of retraining (in related disciplines) and advanced training. In addition, teachers undergo advanced training in the field of digitalization of the educational process and the development of pedagogical skills (such programs are mandatory in all universities)

Unfortunately, specific and accurate information on all universities in Russia is impossible to obtain.

1. Please describe the current state of the staff training on consumer behaviour relevant to energy efficiency and climate change. Is it sufficient?

For the formation of a lean model of behavior among the population of the Russian Federation, activities are being carried out to develop educational materials and training according to the developed programs. To ensure the fulfillment of the objectives of these projects, a network of Integrated Training Centers in the field of energy efficiency is used. These centers have been established in all federal districts of the Russian Federation on the basis of the leading universities subordinated to the Ministry of Science and Higher Education of Russia. However, the direction of advanced training in the field of climate change is not developed. Not enough attention is paid to these problems at the level of personnel training and retraining.



The whole current state of the staff training in HEI is enough, but we need to increase their skills in multidisciplinary areas of research concerning integration efficient technologies and urban design in consumer behavior relevant to energy efficiency and climate change. The current state isn't sufficient as very intensive process of educational programs development and high-rise demand on such topic exists. Our staff members know only parts of the topic but don't have the hole vision of the educational content on consumer behaviour relevant to energy efficiency and climate change and its practical use. Perhaps public understanding of issues related to consumer behavior in the field of energy efficiency and climate change will require changes in existing standards and educational programs. Work is needed to develop questions, topics and challenges for consumer behavior in the field of energy efficiency and climate change.

6. Does the academic staff have flexibility in designing its own skill development plans or does it have to follow a centrally determined package?

There are both opportunities for teachers to develop their skills.

7. Is there staff stability, or does it suffer from high turnover among such professionals?

There is no high staff turnover among MGSU teachers. The teaching staff is quite stable. There is a natural retirement of teachers who have reached retirement age, and the inclusion of young teachers in the educational process. In recent years, MGSU has adopted a program for training young promising teaching personnel, encouraging (including with the help of material incentives) the protection of candidate and doctoral dissertations.

8. What staff skills are required for integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):

HVAC:

- Energy efficient building and microclimate engineering systems.
- Energy efficient systems of heat supply, gas supply and heat generating installations.
- City as a set of energy efficient buildings with energy efficient infrastructure and a changeable climate.
- Sociological aspects of energy efficiency in the urban environment and climate change.
- Psychological aspects of the energy efficiency of the urban environment and climate change.

Urban Planning:

- Multidisciplinary knowledge: urban planning, urban sociology, technologies, nature sciences and so on.
- Skills on problem base learning: achieving new skills through problem analysis on consumer behaviour relevant to energy efficiency and climate change.
- Skills on urban studies based on scientific approach to the researches of different aspects of consumer behaviour relevant to energy efficiency and climate change.
- Theoretical skills on the topic.
- Skills to use special software.

9. Please list up to five major gaps in integrated education on consumer behaviour relevant to energy efficiency and climate change related to staff skills:

HVAC:



- Comprehensive energy efficiency of the building
- Integrated energy efficiency of the urban environment
- Sociological aspects of the behavior of people in the building and city from the perspective of energy efficiency and climate change
- Psychological aspects of the behavior of people in the building and city from the perspective of energy efficiency and climate change
- Integrated energy efficiency of urban engineering infrastructure

Urban Planning:

- Multidisciplinary approach that will allow to present and explain the whole topic bases on urban planning, urban sociology, technologies, nature sciences.
- Implementation of problem base learning approach will provide the skills to solve practical problems and to accept right decisions in urban planning design.
- Scientific justification of research project implemented in master's and PhD programs.
- Theoretical base providing study process.
- Implementation of special software in study process will provide modern approach.



5.4 Access to Information, Knowledge and Technology

Access to information, knowledge and technology is becoming increasingly critical for sustaining long-term growth and development of education. It relates to the capacity to enable academic staff and students to mobilize, access and use information and knowledge, including access to and effective use of internet. Please answer following questions.

1. Do students and teachers have access to the novel educational resources on consumer behaviour relevant to energy efficiency and climate change? Please specify:

1.1. Printed learning materials in national language:

HVAC:

There are no educational materials in the national language, since this topic is new and requires research and the formation of new modules and educational programs.

Urban Planning:

There are some learning materials in the content of textbooks and manuals on different disciplines of our educational plans.

1.2. Printed learning materials in English or other languages:

HVAC:

There are no educational materials in English or other languages, as there was no public understanding of the importance of issues related to energy efficiency and climate change.

Urban Planning:

There is no learning materials in English

1.3. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in national language:

There are no online training materials. Not familiar with them.

1.4. Online learning materials (open-source videos, simulators (calculators and software), case studies, text material) in English or other language:

There are no online training materials. Not familiar with them.

2. Does HEI use MOODLE for educational purposes?

E-Learning platform (similar to moodle) for distance education

3. Does HEI use computer-based intelligent systems, MOOCs, computer learning systems, big data mining for educational purposes? Please specify:

E-Learning platform (similar to moodle) for distance education

4. Does HEI use software for integrated education on consumer behaviour relevant to energy efficiency and climate change? Please specify:

We don't have such software

5. What Information/Knowledge/Technology is required for integrated education on consumer behaviour relevant to energy efficiency and climate change (please list up to five major needs):



- Information on the positive experience of teaching the population energy-efficient behavior and behavior with regard to climate change in the countries of partner universities;
- Information on the real state of behavior of the population in the countries of partner universities.

HVAC:

- Weather Station.
- Measurement of solar radiation.
- Solar collector with heat pump.
- Ambient air quality monitoring station.
- A set of instruments for energy audit of buildings.

Urban Planning:

- Approaches in urban design to provide implementation of energy efficiency and climate change goals in practice.
- Social studies to provide consumer behaviour relevant to energy efficiency and climate change

6. Please list up to five major gaps in access to information, knowledge and technology pertinent to integrated education on consumer behaviour relevant to energy efficiency and climate change:

- • Information on the positive experience of teaching the population energy-efficient behavior and behavior with regard to climate change in the countries of partner universities;
- • Information on the real state of behavior of the population in the countries of partner universities.

HVAC:

- Weather Station.
- Measurement of solar radiation.
- Solar collector with heat pump.
- Ambient air quality monitoring station.
- A set of instruments for energy audit of buildings.

Urban Planning:

- Approaches in urban design to provide implementation of energy efficiency and climate change goals in practice.
- Social studies to provide consumer behaviour relevant to energy efficiency and climate change