МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
ЗАПОРІЗЬКИЙ НАЦІОНАЛЬНИЙ УНІВЕРСИТЕТ

Л. В. Мосієвич

ПРОФЕСІЙНО-ОРІЄНТОВАНИЙ ПРАКТИКУМ ІНОЗЕМНОЮ МОВОЮ

практикум для здобувачів ступеня вищої освіти магістра
спеціальності «Теплоенергетика»
освітньо-професійної програми «Теплоенергетика»

Затверджено
вченою радою ЗНУ
Протокол №13 від 28.06.2022

Запоріжжя
2022

УДК:811.111’276.6:621.4(076.5)
М 818

Мосієвич Л. В. Професійно-орієнтований практикум іноземною мовою : практикум для здобувачів ступеня вищої освіти магістра спеціальності «Теплоенергетика», освітньо-професійної програми «Теплоенергетика». Запоріжжя : Запорізький національний університет, 2022. 59 с.

Практикум призначений для здобувачів ступеня вищої освіти магістра спеціальності «Теплоенергетика» освітньо-професійної програми «Теплоенергетика» для використання під час аудиторних занять.

Основною метою видання є формування англомовної професійно-комунікативної компетенції. До змісту практикуму включено теми, спрямовані на формування комунікативної компетенції в читанні та говорінні, розвиток умінь писемного мовлення, збагачення термінологічного словникового запасу.

У практикумі подано в систематизованому вигляді програмний матеріал дисципліни «Професійно-орієнтований практикум іноземною мовою». У виданні представлено матеріал з 12 тем, об’єднаних у 4 розділи: Fundamentals of professional communication, Academic communication, Traditional sources of energy, Alternative sources of energy. Структура розділів уніфікована і включає автентичні тексти професійної тематики, комплекс мовних і мовленнєвих вправ та завдання, що сприятимуть розширенню активного тематичного словника й формуванню комунікативних умінь писемного та усного мовлення.

Видання спрямоване на формування у майбутніх інженерів з теплоенергетики практичних навичок володіння англійською мовою в обсязі, необхідному для роботи з науковою літературою за фахом; навичок усного спілкування в професійній сфері в контексті окресленої тематики.

Рецензент

С. В. Іваненко, кандидат філологічних наук, доцент кафедри викладання другої іноземної мови, в.о. завідувача кафедри іноземних мов професійного спрямування

Відповідальний за випуск

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ЗМІСТ

ВСТУП

Відповідно до робочої програми дисципліни «Професійно-орієнтований практикум іноземною мовою » є обов'язковою дисципліною у навчальному плані підготовки здобувачів ступеня вищої освіти магістра спеціальності Теплоенергетика» освітньо-професійної програми «Теплоенергетика» для студентів першого року навчання. Основним *завданням* курсу є формування навичок ефективної комунікації англійською мовою в академічному, науковому, професійному середовищі.

У результаті вивчення навчальної дисципліни студент повинен набути таких результатів навчання (знання, уміння тощо) та компетентностей: *загальні компетентності* (знання та розуміння предметної області та розуміння професійної діяльності; вміння виявляти, ставити та вирішувати проблеми; здатність спілкуватися з представниками інших професійних груп різного рівня; здатність діяти соціально відповідально та свідомо); *спеціальні компетентності* (здатність здійснювати інноваційну діяльність в теплоенергетиці); *програмні результати навчання* (вільно спілкуватися державною мовою з професійних питань, обговорювати результати виробничої, наукової та інноваційної діяльності з фахівцями та нефахівцями; дотримуватись вимог вітчизняного і міжнародного законодавства і практик міжнародної діяльності у сфері теплоенергетики; розуміння професійних і етичних стандартів діяльності, застосування їх під час діяльності у сфері теплоенергетики; ефективно співпрацювати з колегами, беручі відповідальність за певний напрям і свій внесок до спільних результатів діяльності, а також власний розвиток і розвиток колективу).

Для досягнення компетентностей студент повинен **знати:**

- базову фахову термінологію іноземною мовою;
- основні фахові міжнародні видання та науково-метричні бази даних із галузі енергетики;
- можливості використання їх інформативного потенціалу для проведення досліджень;
- правила складання наукових статей, анотацій, доповідей іноземною мовою;
- правила складання CV іноземною мовою;

уміти:

- володіти й вільно оперувати фаховою іноземною термінологією;
- користуватися сучасними міжнародними академічними виданнями та спеціалізованими науково-метричними базами даних із галузі енергетики;
- користуватися сучасними спеціалізованими словниками з різних галузей науки і техніки;
- володіти електронними засобами перекладу як у режимі on-line, так і спеціалізованими програмними продуктами (Lingvo тощо);
- складати анотації та резюме статей іноземною мовою;

- писати наукові статті іноземною мовою;
- складати особисте резюме та CV;
- складати анотації до кваліфікаційних робіт та наукових статей іноземною мовою;
- розробляти презентації до доповідей і виступити на науковій конференції;
- здійснювати інноваційну діяльність в енергетиці;
- розуміти професійні і етичні стандарти діяльності, застосовувати їх під час діяльності у сфері енергетики.

У виданні представлено матеріал з 12 тем, об'єднаних у 4 розділи: Fundamentals of professional communication, Academic communication, Traditional sources of energy, Alternative sources of energy. Тексти висвітлюють загальні та сучасні проблематичні питання енергетичної галузі. Структура кожної з тем уніфікована і включає:

- підготовчу роботу, спрямовану на сприймання тексту;
- основний текст та блок завдань до нього, що спрямовані на активізацію певного лексичного матеріалу та розвиток іншомовної професійної компетентності у говорінні та письмі.

В якості додатка до видання включено англо-український словник термінів з теплоенергетики, необхідних для розуміння текстів видання. Окрім того, додаток містить список наукових кліше для написання анотацій до фахових статей та власне статей. Викладення матеріалу ґрунтується на принципах методики CLIL.

CHAPTER 1. FUNDAMENTALS OF PROFESSIONAL COMMUNICATION
UNIT 1. CAREER

I. Preparation

Before reading study the following vocabulary:

employee/employer
a full-time/part-time job
job interview
to apply for a job
vacancy

to fire somebody, to sack somebody
to give somebody notice
unemployment
flexible timetable
salary
to work in shifts
to work overtime

II. Reading Text

Strategies to Build a Successful Career

Having a successful career will offer you a lot of benefits and real profitable opportunities. As we live in a world governed by social status and money, working your way up to the top will definitely improve your quality of life. There are many possible reasons for which an individual would desire success.

1. Identify Your Goals

You need to identify what are your biggest rational wishes. Then, start going deeper and make an in-depth introspection in which you should think about the connection between your inner desires and your rational goals.

They have to match. Otherwise, you will not be truly fulfilled with your professional life. Identifying your goals takes some time and effort, but it is a truly important process in any successful person's journey.

2. Build a Professional Resume

By taking care of this aspect, you are making sure that you'll never be caught off guard. Opportunities are everywhere, and you should always be ready with a quality resume. I believe that letting professionals deal with your resume is a productive choice.

3. Become Aware of Your Strengths

Awareness is an essential key to personal improvement. By being aware of your inner thoughts, your strengths, your desires, and your disadvantages, you can adapt your life to whatever conditions you' re being put through. You'll also get many benefits as you can leverage your knowledge and wisdom for the best purposes.

No matter your strengths and disadvantages, you should choose a career path that advantages your traits and qualities.

4. Assume Full Responsibility for Your Life

One difference between mediocre and successful professionals: responsibility. Even though you know the concept, you may not apply it every day. Whenever something bad happens, you need to assume it.

Start assuming responsibility for all of your actions and never blame anyone for your mistakes. That's the worst thing someone can do. Do not take things personally, and be calm.

5. Always Raise Your Standards

Here's another critical factor that differentiates the successful from the non-successful. Your standards influence the way you think, believe, and behave. If your standards are high, you'll never be satisfied with less than you can accomplish. People with high standards are most of the time more successful than the average.

Every two or three months take a moment to reflect upon your standards and values. Try to improve them bit by bit up until you realize that you've become the best version of yourself.

6. Brand Yourself

Branding is very important nowadays. Big companies are spending hundreds of millions in order to establish themselves as the "big dogs" in the marketplace. It is an old business strategy used by almost every professional company. Your branding is your image in the marketplace.

Professional employees should brand their names and services and constantly improve it. You can do that by starting a blog, creating a professional social media profile, or simply by providing awesome services.

7. Network -- A LOT

Networking is all about opportunities and connections. When you meet new people, you basically get a chance to use their skills to your advantage. Of course, you must also give back something: your services, your knowledge, your money. Successful people always network and create those life-lasting profitable relationships.

Start by creating social media profiles on LinkedIn, Twitter, and Facebook. These three specific networks are the best choices when it comes to this type of activity.

✍ After-reading tasks

1. Insert the appropriate word or word combination from Vocabulary:

There are as many kinds of careers as there are people. They vary greatly in the type of work involved and in the ways they (1) _____ a person's life.

The kind of career you have can (2) _____ your life in many ways. For example, it can (3) _____ where you live and the friends you make. It can reflect how much education you have and can determine the (4) _____ of money you earn. Your career can also affect the way you feel about yourself and the way other people act toward you. By making wise decisions (5) _____ your career, you can help yourself build the life you want.

To make wise career decisions and plans, you need as much information as possible. The more you know about yourself and career (6) _____, the better able you will be to choose a (7) _____ career.

Learning about oneself. People differ in what they want from a career. Many people desire a high income. Some hope for fame. Others want (8) _____. Still others want to serve people and make the world a better place.

Before you begin to (9) _____ career fields, you should determine (a) your values; (b) your interests; and (c) your aptitudes (abilities). Most people are happiest in jobs that (10) _____ their values, interests, and aptitudes.

Each person has many values, which vary in strength. For example, money is the strongest value for some people — that is, wealth is more important to them than anything else. As a result, they (11) _____ their thoughts, behaviour, and emotions on the goal of earning a high income. Other values include devotion to religion, taking risks, spending time with family, and helping others. People should understand their values prior to making a career decision.

You can develop an understanding of your values by asking yourself what is most important to you and by examining your beliefs. For example, is it important to you to work as a member of a team? Or would you rather be in charge or work alone? If working alone or being in charge is important to you, independence is probably one of your (12) _____ values.

	A	B	C	D
1	move	influence	persuade	guide
2	move	interest	disturb	affect
3	control	choose	determine	discover
4	amount	mass	volume	supply
5	in relevant to	concerning	respect	in a case
6	hours	moments	occasions	opportunities
7	satisfying	delightful	comfortable	suitable
8	accident	experience	adventure	incident
9	research	examine	inspect	explore
10	fit	agree	change	belong
11	move	meet	focus	follow
12	best	primary	elementary	primitive

2. **Answer the questions:**
   1) Do you agree with all strategies for building a successful career?
   2) What categories of people are a part-time job suitable for?
   3) Is the unemployment level high in Ukraine?
   4) What steps should you take to apply for a job?
   5) Why is it difficult/easy to run a firm?
   6) What are the most important criteria for a successful job?

3. **Quiz:**

1. Abilities relating to dealing with persons on the job
a) Interpersonal
b) Teamwork skills
c) Networking
d) Punctuality
2. A meeting between an employer and a job applicant
a) board meeting
b) interview
c) on the job training
d) negotiation

3. A person working for someone else
   a) employer
   b) employee
   c) co-worker
   d) trainee
4. A form in which you supply information about yourself that will help an employer make a hiring decision
   a) References
   b) Summary
   c) CV
5. Someone who hires another person
   a) Employee
   b) Employer
   c) HR
   d) Job personnel
6. People who know an applicant well and can provide information about that person professionally
   a) Parents
   b) References
   c) Acquaintances
   d) Colleagues
7. Being able to easily accept new challenges
   a) Flexible
   b) Integrity
   c) Creativity
   d) Aptitude

4. **Speak upon the strategies for building a successful career.**

5. Write your own CV based on the sample

STEVEN TERRY

Sales Staff

CONTACTS

Male

May 19, 1992

986-2323-3434

Steven@3223.com

Http://steven-info.me

London, England

OBJECTIVE

Take advantages of sales skills & experience and understanding of market to become a professional Sales Staff and bring a lot value to Customers. From that, I will contribute to development of TOPCV Company.

SKILLS

Language: English, Japanese, Chinese

Computer: Word, Excel, Powerpoint

INTERESTS

I like soccer, music..

EDUCATION

Oct 2010 - May 2014

TOPCV University, Major: Corporate Administration

GPA: 3.6/4

Oct 2010 - May 2014

TOPCV University, Major: Corporate Administration

GPA: 3.6/4

WORK EXPERIENCE

June 2014 - Present

TOPCV JSC, Sales Staff

- Write and upload product advertising post via Facebook, Forum...
- Introduce, consult products and answer customers' queries via phone and email.

Nov 2013 - Jun 2014

TOPCV Shop, Part-time Sales Staff

- Sell goods for Foreigners and Vietnamese at the Shop
- Advertise products on media publications such as: banner, posters,leaflets...
- Make reports of sales every day.

ACTIVITIES

Jan 2014 - Feb 2014

TOPCV - EDUCATION TALK 2014, Member of US Ambassador

- Organize monthly events, network with US alumni
- Share how to hunt scholarships and US student's life experiences to all students who have received offers from US universities

HONORS & AWARDS

2013-2014: TOPCV Scholarship in 2nd semester 2012-2013 and 1st semester 2013-2014

REFERENCES

Mr: Jack Harison - Director of TOPCV JSC

Phone: 986-2323-3434

Unit 2. SOFT SKILLS

I. Preparation

Before reading study the following vocabulary:

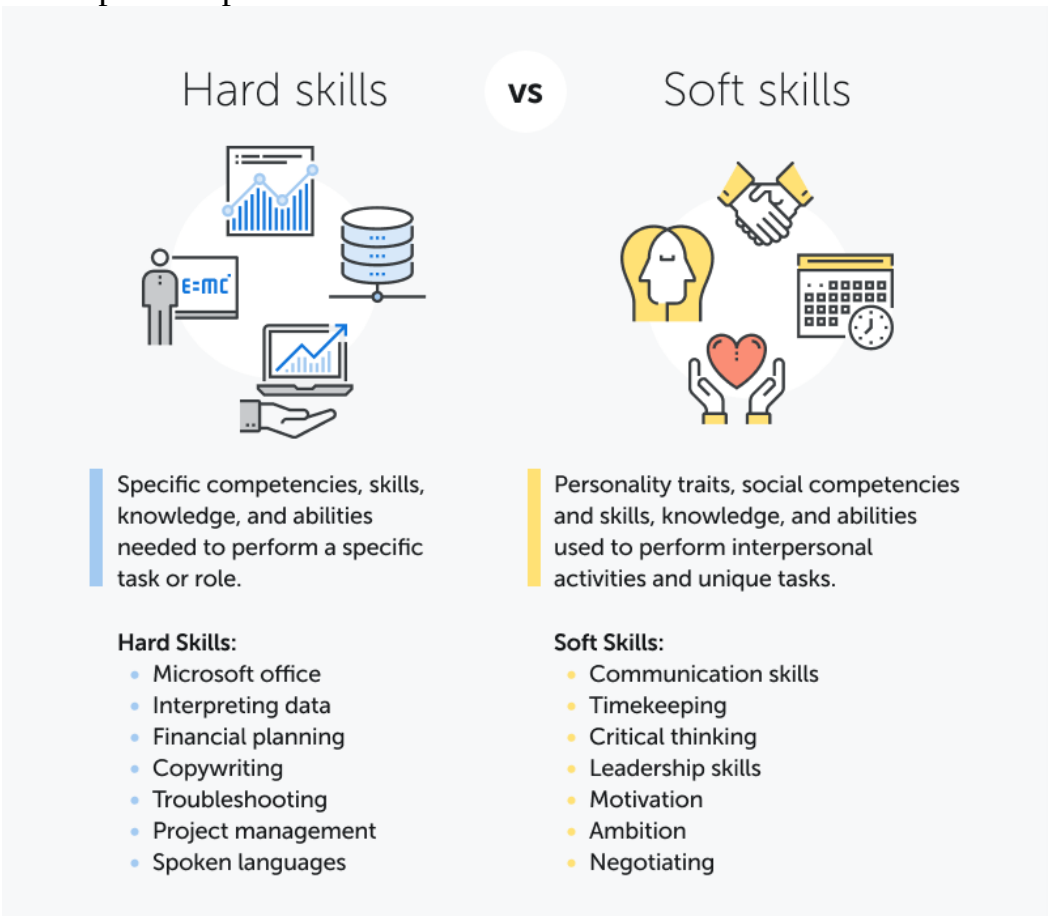
to perform
to define
abilities
negotiating
troubleshooting
measurable
specific tasks
requirements
accurate
to highlight
to elaborate

II. Reading Text

Hard skills vs. Soft skills

When you are looking for new recruits or promoting from within there will be a set of skills your roles require. Some skills people will have as part of their nature, while others need to be taught.

The hard skills can be defined as part of the role specification. And soft skills are defined as the person specification.



What are Hard Skills?

Hard skills are specific competencies, skills, knowledge, and abilities needed to perform a specific task or role. They can be learned through education and professional development. Usually, they are technical (but not always) and easily measurable.

Hard skills can be demonstrated through educational certificates or practical demonstrations.

For example, software development requires knowledge of some programming language and can be used for a variety of tasks, but the main goal is to write a computer program. The proficiency level can be easily measured.

Another example, design (of course it can be different - interior design, web design, etc.) but in general it is a specific skill set needed to perform exact tasks.

Microsoft suite knowledge, another example of hard skills, you can learn how to use Microsoft Word and Excel, and most often it will be needed for specific tasks.

So, each role will have different skill set requirements but they will be needed to perform a specific task.

What are Soft Skills?

Soft skills are personality traits, social competencies and skills, knowledge, and abilities used to perform interpersonal activities and unique tasks. Sometimes they are also called *human* skills.

Usually, they are more closely linked to people's personality traits they are born with and social skills. But they also can be trained and developed through practice and professional development.

Unfortunately, it is not that easy to gauge if someone has the right soft skills as there is less information to draw upon. This is especially true when hiring new employees as their soft skills will need to be assessed by getting to know them.

There are specific techniques and tests that can be used to measure soft skills, but note the results will be quite vague and not accurate. Only real-life situations will display how good people are in this area.

Certain soft skills you would ideally like all of your employees to have are punctuality and collaboration. Other skills might only be necessary for specific roles like leadership, communication, strategic thinking, and problem-solving.

Soft skills don't come with certification but they are easily identified while working with someone. People with leadership skills will naturally take ownership and step up to lead. Those who are excellent timekeepers will always be on time or be forthcoming about potential lateness.

How to highlight your skills throughout the interview process

Once you make it to the interview phase, you will have an opportunity to display your soft skills and elaborate more on your hard skills. You may be asked to display your hard skills with a test or portfolio.

You can highlight key soft skills by:

Showing up on time or early to the interview (punctuality or dependability)

Maintaining eye contact (active listening)

Speaking clearly when prompted (effective communication)

Answering questions about your resume and experience honestly (integrity)

Asking follow-up questions (active listening)

You can highlight your hard skills by:
Elaborating on your experience and training
Providing a portfolio (digital or physical)
Effectively answering technical questions related to the work
Asking follow-up questions related to the work
Effectively working through skills tests (if required at the interview)

(From: https://www.valamis.com/hub/hard-skills-vs-soft-skills)

✍ After-text exercises

1.Tick the sentences true/false:

1) Hard skills may be easy to observe, quantify, and measure.
2) Hard skills are not generally listed in the job postings or job descriptions.
3) Hard skills are often learned in schools, Universities, and from books.
4) Soft skills are the Non-Technical Skills necessary for success in the workplace.
5) Soft skills are not typically associated with the behaviors and personality traits of an individual.

2. Insert the appropriate word or word combination from Vocabulary:

1) Hard skills are technical (but not always) and easily ….
2) We need someone who is practised at … business deals.
3) He's very good at … because he knows these computers as well as anybody.
4) The report … the need for improved safety.
5) He refused … on why he had resigned.
6) The figures they have used are just not …
7) We usually ask interviewees … a few simple tasks on the computer just to test their aptitude.
8) One of the …of the job is fluency in two or more languages.

3. Find in the text the examples of the Passive Voice.

4. Answer the questions:

2) What soft skills do you have?
3) What soft skills would you like to have?
4) Is it possible for a person to have all of them?
5) What soft skills should an engineer have?
6) What steps should be taken to develop soft skills?
7) What is troubleshooting
8) Evaluate your hard skills.

5. Speak about the differences between hard and soft skills.

UNIT 3. MY SPECIALTY

I.Preparation

Before reading study the following vocabulary:

contribution
renewable
availability
to deteriorate
assets
to deplete
to take into account
competitiveness
opportunity
appropriate
mutual exchange
graduates
facilities
state-of-the-art

II. Reading Text

Heat power engineering Bachelor's degree programme in Ukraine

Heat power engineering is the most important part of the national Ukraine's economy. It provides the functioning of all national economy sectors, the consolidation of Ukraine's subjects, makes a decisive contribution to the formation of the main financial and economic indicators of the country and ensures Ukraine's energy security.

During the students' training in the educational program "Heat power engineering" the main emphasis is paid on the formation and development of professional skills in heat power engineering, i.e. the ability to solve complex special and practical problems in professional engagement: the formation and use of heat energy, special non-conventional and renewable energy sources, control over heating and power processes and systems, organizational and legal aspects of heat power management.

The educational program focuses on training professionals who have deep knowledge and are able to solve: the availability of investment resources for the industry appeal; the unsatisfactory condition of the energy sector, which continues to deteriorate due to the technical aging of fixed assets, most of which have already depleted their resources and need immediate modernization or replacement; lack of investment for fixed assets modernization of thermal energy.

The program is created taking into account the development of scientific trends and industrial areas of the field, heat power engineer's tasks and duties in institutions, organizations or research institutes, to increase the competitiveness of graduates in the labor market and their professional and scientific growth.

Program Benefits:

- The program encourages students to participate in research studies, write academic papers and take part in international conferences, forums, seminars, contests and academic competitions in the specialty.
- The high level of specialists' practical training is provided by the developed international cooperation in scientific and educational fields.
- Lifelong training to improve professional and other activities.
- Opportunity to continue training at the next level of higher education (master's degree), including the cross-entry system in specialties of any field, that is not prohibited by law, in case of successful passing appropriate entrance exams.
- Cooperation with leading Ukrainian institutions of higher education for the organization of mutual exchange of students, teachers and administrative staff according to the cooperation agreement.

Main disciplines of professional training

Boiler Installations of Industrial Enterprises; Heat Supply Sources of Industrial Enterprises; Heating Energy Distribution and Heat System Use; Operation and Adjustment of Thermal Power Equipment; Heat Distribution Networks and their Equipment; Basics of Energy Conservation; Heating Processes and Installations; Ventilation Systems in Heat Power Engineering; Transportation and Use Systems of Combustible Gases in Heat Power Engineering; Gas Networks and Equipment of Gas Networks; Hydraulic and Aerodynamic Machines; Dust Collection and Industrial Wastes Remediation; Alternative and Renewable Energy Sources; Fuel and Combustion Theory; Heat Power Systems of Industrial Enterprises; Steam and Steam Turbines.

Positions that graduates can hold

A characteristic feature of the educational-professional program "Heat Power Engineering" is its interdisciplinary nature, which allows graduates to master skills in various fields of professional engagements. It will enable young professionals to be competitive and adapt to the dynamic conditions of the labor market, to join the ranks of professional heat engineers, and to hold relevant positions according to the National Classification of Ukraine «Occupational Classification»;

- 3115 - Heating engineer;
- 3113 - Technician for operation of solar power systems, energy technician;
- 3117 - Technician for operation of gas facilities objects;
- 3112 - Technician of sanitary systems, technician-designer;
- 3119 - Technician - heating engineer;
- 3111 - Specialist in energy management in buildings;
- 2147.2 - Ventilation engineer, gas facility objects operation engineer

Joint Nordic Master's degree programme
Innovative Sustainable Energy Engineering

Study track focus and goal:

This track meets the challenges set by global warming and depletion of fossil fuel resources by providing world class education in advanced technologies and systems for efficient, clean and competitive conversion, distribution and use of electricity, heating and cooling.

Training is provided in the use of optimization and modelling tools for design and planning on the technical plant level, including state-of-the-art technologies, at the same time that necessary knowledge on energy systems is given in order to gain perspective. After completion, the student will be well poised for a career within a large number of sectors in industry which utilizes energy, as well as academia. The enormous transformations needed in the energy system in the future, will make such knowledge highly valuable.

Learning outcomes:

Students become skilled in analysis, optimization and design of combined heat and power plants and industrial heat processes, acquiring also state-of-the-art knowledge on technologies for fuel conversion with reduced or zero CO_2 emissions (biomass and waste conversion, Carbon Capture and Storage technologies).

- By acquiring complementary knowledge on an energy systems level, students are trained to approach problem-solving in an interdisciplinary way.
- Students are prepared for a professional career within the energy industry and power generation companies.

✍ After-text exercises

1. Insert the appropriate word or word combination from Vocabulary:

1) **…** technology means the highest level of development, as of a device, technique, or scientific field achieved at a particular time.
2) It is not true there is a crisis in the country's scientific or technological …
3) Is this an… occasion to discuss finance?
4) The hotel offers exceptional sporting… , including a 50 metre swimming pool.
5) A company's …can consist of cash, investments, specialist knowledge, or copyright material.
6) If we continue to …. the earth's natural resources, we will cause serious damage to the environment.

2. Match the words with their definitions:

1. completion	a) to become worse as time passes
2. to deplete	b) to receive an academic degree or diploma
3. entrance	c) relating to, characterized by, or based on competition
4. mutual	d) the act or process of completing
5. competitive	e) to lessen markedly in quantity, content, power, or value
6. to graduate	f) admission
7. to deteriorate	g) of or relating to a plan whereby the members of an organization share in the profits and expenses

3. Answer the questions:

1) What benefits do the students of this program have?
2) Why does that specialty have its interdisciplinary nature?
3) What positions can graduates hold?
4) How many disciplines are taught within Bachelor’s degree program?
5) What is the aim of this educational program?
6) Is that profession essential in Ukraine? Why?
7) Why did you decide to become an engineer?

4. Speak upon the topic: My Specialty

CHAPTER 2. ACADEMIC COMMUNICATION

UNIT 4. WRITING ABSTRACTS AND PROFESSIONAL PRESENTATIONS

Preparation
Use the provided information for writing an abstract of an article:

Writing abstracts

What is an abstract?

An abstract is a 150- to 250-word paragraph that provides readers with a quick overview of your essay or report and its organization. It should express your thesis (or central idea) and your key points; it should also suggest any implications or applications of the research you discuss in the paper

Typically, an abstract for paper or presentation is one or two paragraphs long (120 – 500 words). Abstracts usually spend

- 25% of their space on the purpose and importance of the research (Introduction)
- 25% of their space on what you did (Methods)
- 35% of their space on what you found (Results)
- 15% of their space on the implications of the research

Sample of an abstract:

Purpose	This paper analyzes how novices and experts can safely adapt and transfer their skills to new technology in the medical domain.
Methods	To answer this question, we compared the performance of 12 novices (medical students) with the performance of 12 laparoscopic surgeons (using a 2D view) and 4 robotic surgeons, using a new robotic system that allows 2D and 3D view.
Results	Our results showed a trivial effect of expertise (surgeons generally performed better than novices). Results also revealed that experts have adaptive transfer capacities and are able to transfer their skills independently of the human-machine system. However, the expert's performance may be disturbed by changes in their usual environment.
Implications	From a safety perspective, this study emphasizes the need to take into account the impact of these environmental changes along with the expert's adaptive capacities.

Structure components of an article:

Постановка проблеми –problem statement, research justification,
Аналіз останніх досліджень та публікацій – (стан дослідження**)** research publications (previous research, the state of theme research),

Мета статті – the aim (purpose) of the article (paper),
Виклад основного матеріалу дослідження – the main material,
Висновки – conclusion(s),
Перспективи подальших досліджень – further research prospects,
Список використаних джерел – **r**eferences.

✍ After-text exercises

1. Read the abstract of the article "What is energy efficiency?": what are the peculiarities of a scientific style?

Abstract

This paper critically reviews the range of energy efficiency indicators that can be used, particularly at the policy level. Traditional thermodynamic indicators of energy efficiency were found to be of limited use, as they give insufficient attention to required end use services. The specific limitations and appropriate uses of physical-thermodynamic, economic-thermodynamic and pure economic indicators of energy efficiency are also considered. The paper concludes with a discussion of the persistent methodological problems and issues which are encountered when attempting to operationalize all of the energy efficiency indicators. These include the role of value judgements in the construction of energy efficiency indicators, the energy quality problem, the boundary problem, the joint production problem and the question of isolating the underlying technical energy efficiency trend from the aggregate indicator. (https://www.sciencedirect.com/science/article/abs/pii/0301421596000171)

2. Find any Ukrainian article in your field and write an abstract in English based on the given sample (also see Appendix)

1. The article (paper, book, etc.) deals with…	1. Ця стаття (робота, книга тощо) стосується…
2. As the title implies the article describes…	2. Згідно з назвою, у статті розглядається…
3. It is specially noted…	3. Особливо варто відмітити…
4. Basic information on … is presented.	4. Надається основна інформація про …
5. The text gives a valuable information on…	5. Текст надає цінну інформацію щодо …
6. The paper consists of …parts (chapters). The paper contains the following parts: ……	6. Робота складається з … частин (розділів). Робота складається з наступних частин:…
7. The article is of great help to …	7. Ця стаття стане у нагоді…

8. The article is of interest to…	8. Ця стаття становить інтерес для…
9. It (the article) gives a detailed analysis of …, contains the data on…	9. Стаття дає детальний аналіз…, містить дані про…
10. Special attention is given (paid) to…	10. Особлива увага приділяється…
11. It should be stressed (emphasized) that…	11. Варто зазначити (підкреслити), що …
12. The method proposed …	12. Запропонований метод...

3. Make up a specialty-related presentation using useful phrases:

Introduction

- Good morning/afternoon everyone and welcome to my presentation. First of all, let me thank you all for coming here today.
- Let me start by saying a few words about my own background.
- As you can see on the screen, our topic today is.....
- My talk is particularly relevant to those of you who....
- This talk is designed to act as a **springboard** for discussion.
- This morning/ afternoon I'm going to take a look at the recent developments in.....

Presentation structure

- In my presentation I'll focus on three major issues.
- This presentation is structured as follows....
- The subject can be looked at under the following headings.....
- We can break this area down into the following fields....

Timing

- It will take about X minutes to cover these issues.

Handouts

- Does everybody have a **handout** / copy of my report?
- I'll be handing out copies of the slides at the end of my talk.
- I can email the PowerPoint presentation to anyone who would like it.
- Don't worry about taking notes, I've put all the relevant statistics on a **handout** for you

Questions

- If you have any questions, I am happy to answer them

- If you don’t mind, I'd like to leave questions until the end of my talk /there will be time for a **Q&A** session at the end...

Sequencing phrases

- My first point concerns...
- First of all, I’d like to give you an overview of....
- Next, I’ll focus on.....and then we’ll consider....
- Then I’ll go on to highlight what I see as the main points of....
- Finally, I’d like to address the problem of.....
- Finally, I’d like to raise briefly the issue of....

Highlighting information

- I’d like to put the situation into some kind of perspective
- I’d like to discuss in more depth the implications of....
- I’d like to make more detailed recommendations regarding....
- I’d like you to think about the significance of this figure here
- Whichever way you look at it, the underlying trend is clear

Conclusion

- I’d just like to finish with the words of a famous scientist/ politician/ author.....
- Now let’s go out and create opportunities for...!

UNIT 5. ANALYZING DIAGRAMS, CHARTS

Preparation

Use the provided information for describing bar charts, diagrams, graphs:

Writing tips

Referring to/Describing figures, graphs, tables, diagrams, charts

Fig. 2 shows/presents/depicts/outlines/illustrates/represents…..
Fig. 3 gives an example of…..
Such cases are depicted in the following figures.
This is illustrated in Fig. 5.
….. is/are shown/given in Figs. 3 and 4.
….. can be found in Fig. 8.
Consider Fig. 2, which plots …..versus/against…..
As can be seen from Figs. 5 and 3, …..
As shown in Fig. 1, …..
As follows from the figures shown above, …..
From this figure it can be seen that …..
For the resulting plot, see Fig. 2.
For visual representation of the dependence the reader is referred to Tables V and VI.
Table II summarizes …..
The graph/diagram suggests/indicates that…..

How to begin a description

- Let me show you this bar graph…
- Let's turn to this diagram…
- I'd like you to look at this map…
- If you look at this graph, you will notice…
- Let's have a look at this pie chart…
- If you look at this line chart, you will understand…
- To illustrate my point, let's look at some charts…

How to describe diagrams and other visuals: naming the parts

To describe diagrams or any other type of graphs as clearly as possible, you should name each visual element. For example:

- The vertical axis shows…
- The horizontal axis represents…
- This curve illustrates…
- The solid line shows…
- The shaded area describes…
- This colored segment is for…
- The red bar…

How to describe bar graphs

To express the movement of the line, you should use appropriate *verbs, adjectives, and adverbs* depending on the kind of action you need to show. For this, you should use the following vocabulary:

Verbs: rise, increase, grow, go up to, climb, boom, peak, fall, decline, decrease, drop, dip, go down, reduce, level up, remain stable, no change, remain steady, stay constant, stay, maintain the same level, crash, collapse, plunge, plummet.

Adjectives: sharp, rapid, huge, dramatic, substantial, considerable, significant, slight, small, minimal, massive.

Adverbs: dramatically, rapidly, hugely, massive, sharply, steeply, considerably, substantially, significantly, slightly, minimally, markedly.

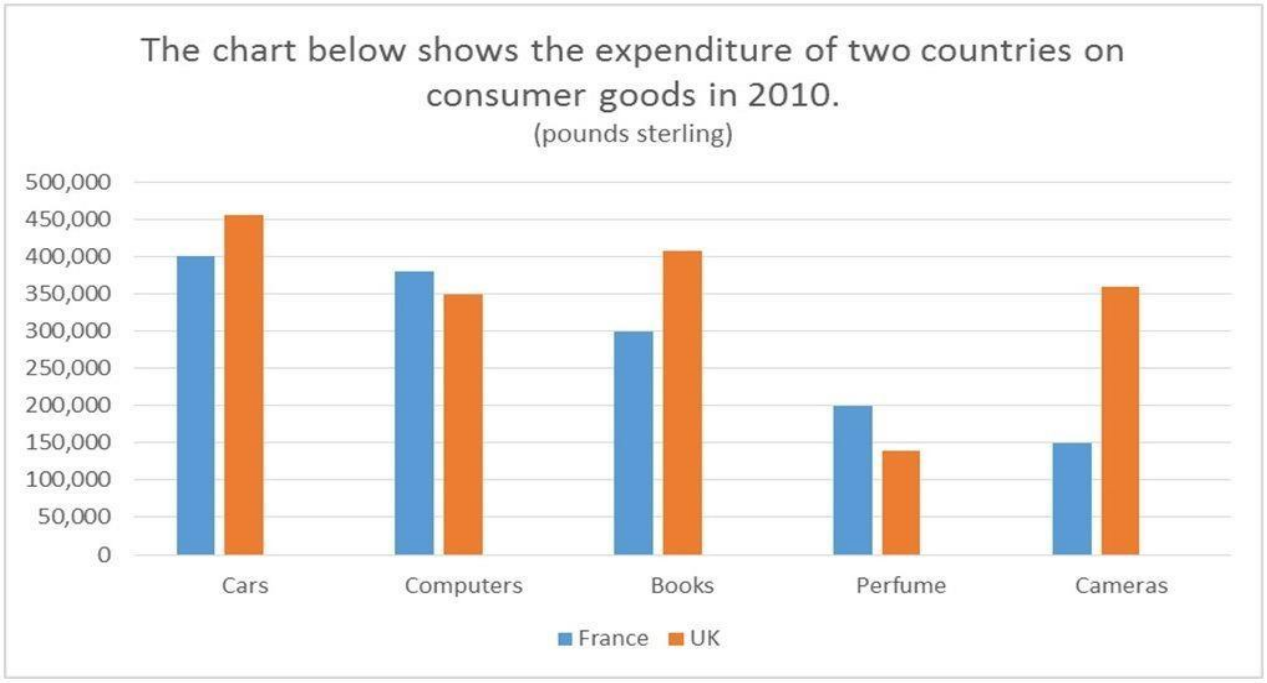
There is also a list of **adverbs** to describe the *speed of a change:* rapidly, quickly, swiftly, suddenly, steadily, gradually, slowly.

How to describe bar charts

The following comparison words can be used interchangeably:

- to compare
- compared to
- as opposed to
- versus
- more than
- the majority of
- only a small monitory
- greater than
- less than

Read the example of how to analyze the chart:



Bar Chart sample answer

The chart illustrates the amount of money spent on five consumer goods (cars, computers, books, perfume and cameras) in France and the UK in 2010. Units are measured in pounds sterling.
Overall, the UK spent more money on consumer goods than France in the period given. Both the British and the French spent most of their money on cars whereas the least amount of money was spent on perfume in the UK compared to cameras in France. Furthermore, the most significant difference in expenditure between the two countries was on cameras.
In terms of cars, people in the UK spent about £450,000 on this as opposed to the French at £400,000. Similarly, the British expenditure was higher on books than the French (around £400,000 and £300,000 respectively). In the UK, expenditure on cameras (just over £350,000) was over double that of France, which was only £150,000.
On the other hand, the amount of money paid out on the remaining goods was higher in France. Above £350,000 was spent by the French on computers which were slightly more than the British who spent exactly £350,000. Neither of the countries spent much on perfume which accounted for £200,000 of expenditure in France but under £150,000 in the UK.

Tips for writing:

1. Organize the report into logical paragraphs with flexible use of linking.
2. Avoid repeating words in the question. Instead, use other words with the same or similar meanings.
3. Use accurate data to support sentences in the body paragraphs.
4. Don't try to explain the chart, you just have to describe what happened, not say why it happened.

✍ After-text exercises

1. Match the sentences or phrases with the same meaning in brackets:

1) The graphs show the trends in … ……
2) In general, … ……
3) The biggest increase in sales was in 2002. ……
4) There was a steady rise in sales. ……
5) Sales saw growth in 2002. ……
6) The highest sales come from 2002. ……

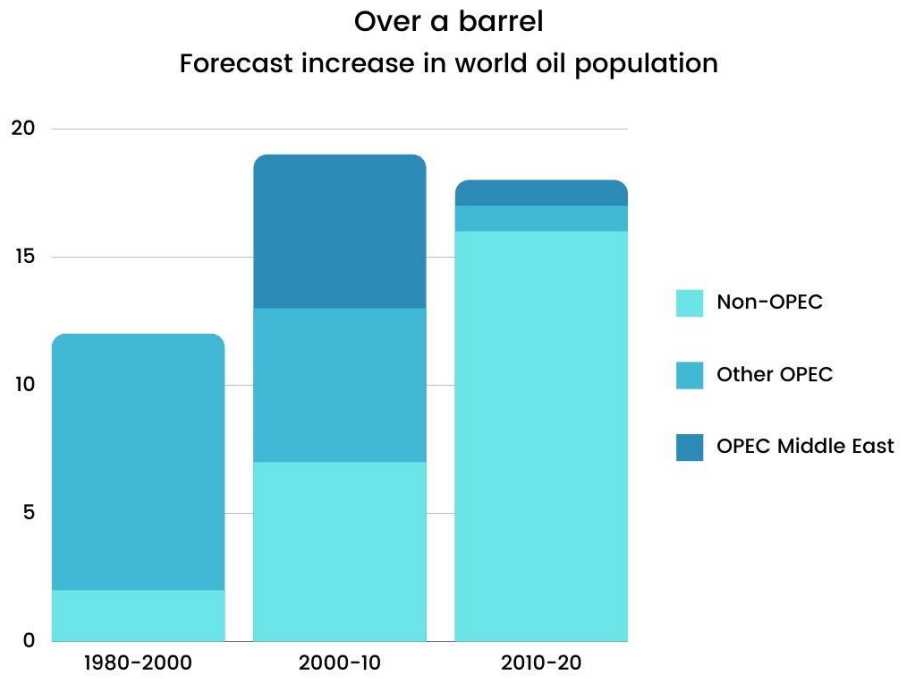
(*Sales grew in 2002. Sales rose steadily. Sales increased the most in 2002. The charts illustrate the changes in … Overall, … 2002 had the highest sales*)

2. **Write the preposition to fill the gap (during, from, of, to, at, by, in, over):**

1) The charts illustrate the percentage of the population who owned their homes ……1995 to 2015.
2) Overall, home ownership increased …… the first eight years of the period.
3) The younger people were, …… less likely they were to own their homes.
4) The most significant increase ... home ownership came from people aged 75 and over.
5) From 2005, home ownership fell most for people aged 18 …… 29.
6) The percentage of people owning their homes started ……around 64% in 1995.
7) The total percentage of people who owned their homes rose …… 69% in 2004.
8) Home ownership fell again …… 69% to 64% by 2015.

3. Describe the chart:

The bar chart below shows the production of the world's oil in OPEC and non-OPEC countries.
Write a short report describing the information shown below. Write at least 150 words.



Report Plan

Paraphrase: shows>offering the data overview of; production of the world's oil in OPEC and non-OPEC countries>production of oil in OPEC and non-OPEC countries across the world
Overview: The graph offers data overview of past, present, and future production of oil in OPEC and non-OPEC countries.
Paragraph 2: (1) Talk about the conditions between the time period of 1980 and 2000. Give figures.
Paragraph 3: (1) Talk about future expectations. Give figures.

CHAPTER 3. TRADITIONAL SOURCES OF ENERGY

UNIT 6. THERMAL ENERGY

I.Preparation

Before reading study the following vocabulary:

hazardous
consumption
emissions
replenish
fossil fuels
storage sights
effluent treatments
wastewater
internal
target

II. Reading Text

Thermal energy

The energy sources that once exhausted, do not replenish themselves within a specific period are called conventional or non-renewable energy sources like coal, gas, and oil. For a long time, these energy sources have been used extensively to meet the energy demands. As the rate of consumption is much greater than the rate of formation, these sources of energy have been depleted and do not replenish. Conventional sources of energy emit hazardous emissions that not only damage the earth's atmosphere also deteriorate the health conditions of the livings.

Thermal energy is a type of power produced by atomic and molecular particle movement within a substance**.** It was first discovered in 1847 by English physicist and mathematician James Prescott Joule, after whom the unit of energy and Joule's Law are named.

Thermal energy is one of six basic forms of energy. They are:

- Chemical energy
- Nuclear energy
- Radiant energy
- Mechanical energy
- Electrical energy
- Thermal energy

The terms thermal energy and heat energy are often used interchangeably as they both involve power created by heat. However, thermal energy refers to the stored or total internal energy of a system's temperature, while heat represents thermal energy transfer. Thermal energy shows promising solutions to a growing need for power because of its ability to store energy to be used later.

Thermal energy sources are fossil fuels like natural gas, coal and oil, as well as solar heat, heat pump electric heat, and geothermal heat. Though thermal energy has relatively few negative impacts on the environment, a few issues need to be tended to before being considered a truly green source of power.

Thermal energy can produce pollution. This pollution is often in the form of escaped chemicals or water released in thermal power plants or storage sights.

Air and water pollution may also be linked to geothermal fields. For example, steam may emit heat waste that might affect cloud formations and weather patterns.

The release of hot or cold water by these thermal energy sources into natural bodies of water such as ponds, streams, and rivers can create a temperature difference and hinder the ecosystem.

Prevention of thermal water pollution can be targeted by monitoring water temperatures and changing them closer to the water's natural temperature.

Effluent treatments can also prevent thermal pollution. Effluent treatments require that wastewater be stored in ponds or reinjected into wells.

(From: https://justenergy.com/blog/thermal-energy-what-it-is-how-it-works-environmental-impact/)

✍ After-text exercises

1. Insert the appropriate word or word combination from the text:

1) Thermal energy has relatively few …. impacts on the environment.
… treatments can also prevent thermal pollution.
2) Thermal energy shows promising solutions to a growing need for power because of its ability …energy to be used later.
3) Prevention of thermal water pollution can be targeted by … water temperatures and changing them closer to the water's natural temperature.
4) Conventional sources of energy emit …emissions.
5) These sources of energy have been … and do not replenish.
6) … may also be linked to geothermal fields.

2. Fill in the table:

Advantages of traditional sources of energy	Disadvantages of traditional sources of energy
1.	
2.	
3.	

3. Answer the questions:

1. What are traditional sources of energy?
2. What are basic forms of thermal energy?
3. What are thermal energy sources?
4. In what way can thermal energy produce pollution?

5. How can we prevent thermal water pollution?
6. Does thermal energy have many negative impacts?

4. Speak upon the advantages and disadvantages of traditional sources of energy

UNIT 7. HOW DOES A THERMAL PLANT WORK

I.Preparation

Before reading study the following vocabulary:

inlet/outlet
airfoil shape
condenser heat exchangers
traffic pumping
pulverized coal
flue gas
down-comer
air draft
stack
precipitator
capacity
heat rejection
pollutants

Watch video «How does a thermal power plant work» (https://www.youtube.com/watch?v=IdPTuwKEfmA) and do the exercises:

✍ **After-video exercises**

1. Match the words with their definitions:

1. Stack	a)Coal that has been crushed to a fine dust in a grinding mill
2. Airfoil shape	b)The air coming out of a chimney after combustion in the burner it is venting
3. Down-comer	c) an apparatus for causing precipitation, especially a device for removing dust from a gas.
4.Pulverized coal	d) the exhaust pipe of an internal combustion engine
5. Precipitator	e) the cross-sectional shape of an object whose motion through a gas is capable of generating significant lift, such as a wing, a sail, or the blades of propeller, rotor, or turbine
6. Flue gas	f) a pipe for leading the hot gases from the top of a blast furnace downward to the dust collectors and flue system

2. **Match the verbs with their definitions:**

1. to come or go back (as to a former condition, period, or subject)	to reject
2. to cause (someone or something) to do something	to decrease
3. to alter the physical or chemical nature or properties of especially in manufacturing	to remove
4. to increase, to raise	to convert
5. to get rid of	to boost
6. to grow progressively less (as in size, amount, number, or intensity)	to revert
7. to refuse to accept, consider	to induce

3. **Fill in the blanks with verbs in Passive (***is added, is provided, is burnt, is separated, can be repeated, has been converted, is limited, is mixed, is supplied*):
   a) For this purpose heat …. to the exit of the pump with the help of a boiler.
   b) Pulverized coal … inside a boiler (is burnt).
   c) The pure steam … at a steam drum.
   d) The cycle …. over and over again.
   e) Super heating … to the threshold.
   f) Hot steam from a turbine … into a feed water.
   g) The cold liquid … at a condenser with the help of a cooling tower.

4. **Translate the given multicomponent terms, find more examples of multicomponent terms in that field in Glossary and explain the way of their translation:** condenser heat exchangers, water tube boiler, turbine rotor blades.

5. **Match the technologies with their description:**

1. Recovery of blast furnace gas	**a)** these produce heat (their principal role) simultaneously with electricity (their secondary role) in a single installation and employing a single fuel.
2. Gas turbines and turbojets	b) electricity production can also be obtained by recovering and recycling gases from iron and steel production (blast-furnace gas, coking plant gas, steel plant gas), using a traditional boiler (a comparable technology to traditional thermal power plants) or

	in a heat recovery boiler in a combined cycle gas plant.
3. Cogeneration units	c) mostly used to supplement the electricity production of other thermal plants, gas turbine and turbojet units can take over very rapidly in the event of a failure of other power plants or of unexpected peaks in consumption.

6. Speak upon the topic «How does a thermal power plant work».

UNIT 8. HYDROPOWER

I.Preparation

Before reading study the following vocabulary:

diversion
accounts
facilities
affordable
elevation difference
duration
lifespan
reliable form
flood control

II. Reading Text

WHAT IS HYDROPOWER?

Hydropower, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity. Hydropower currently accounts for 37% of total U.S. renewable electricity generation and about 7% of total U.S. electricity generation.

While most people might associate the energy source with the Hoover Dam—a huge facility harnessing the power of an entire river behind its wall—hydropower facilities come in all sizes. Some may be very large, but they can be tiny, too, taking advantage of water flows in municipal water facilities or irrigation ditches. They can even be "damless," with diversions or run-of-river facilities that channel part of a stream through a powerhouse before the water rejoins the main river. Whatever the method, hydropower is much easier to obtain and more widely used than most people realize.

Hydropower technologies generate power by using the elevation difference, created by a dam or diversion structure, of water flowing in on one side and out, far below, on the other.

Hydropower is an affordable source of electricity that costs less than most. Since hydropower relies only on the energy from moving water, states that get the majority of their electricity from hydropower, like Idaho, Washington, and Oregon, have lower energy bills than the rest of the country.

Compared to other electricity sources, hydropower also has relatively low costs throughout the duration of a full project lifetime in terms of maintenance, operations, and fuel . Like any major energy source, significant upfront costs are unavoidable, but hydropower's longer lifespan spreads these costs out over time. Additionally, the equipment used at hydropower facilities often operates for longer periods of time without needing replacements or repairs, saving money in the long term.

The installation costs for large hydropower facilities consist mostly of civil construction works (such as the building of the dams, tunnels, and other necessary infrastructure) and electromechanical equipment costs (electricity-generating machinery). Since hydropower is a site-specific technology, these costs can be minimized at the planning stage through proper selection of location and design.

The benefits of hydropower have been recognized and harnessed for thousands of years. In addition to being a clean and cost-effective form of energy, hydropower plants can provide power to the grid immediately, serving as a flexible and reliable form of backup power during major electricity outages or disruptions. Hydropower also produces a number of benefits outside of electricity generation, such as flood control, irrigation support, and water supply.

The history of hydropower dates back thousands of years. For example, the Greeks used water wheels to grind wheat into flour more than 2,000 years ago. The evolution of the modern hydropower turbine began in the mid-1700s when a French hydraulic and military engineer, Bernard Forest de Bélidor, wrote *Architecture Hydraulique*. Many key developments in hydropower technology occurred during the first half of the 19th century, and more recently, the past century has seen a number of hydroelectric advancements that have helped hydropower become an integral part of the renewable energy mix in the United States.

✍ After-text exercises

1.Match the words with their definitions:

1. facility	a) it is good value for the amount of money paid
2. maintenance	b) the agricultural process of applying controlled amounts of water to land to assist in the production of crops
3. outages	c) A building where electric power is generated.
4. cost-effective	d) any device that provides instantaneous, uninterruptible power.
5. reliable	e) the process of preserving a condition or situation or the state of being preserved
6. irrigation	f) something such as a place, building, or equipment used for a particular purpose or activity:
7. renewable	g) a system of wires through which electricity is connected to different power stations across a region
8. backup power	h) something that is reliable can be trusted or believed
9. grid	i) can be used and easily replaced

10.powerhouse	j) a period when a service, such as electricity, is not available:

2. **Fill in the blanks with the following words** (renewable, backup power cost-effective, facility, grid, maintenance):

1) A few countries generate all their electricity using … energy already.
2) The bank must be run in a … way.
3) The window had been replaced last week during routine ….
4) Electrical … vary in size and can cover whole countries or continents.
5) The resort has a wide range of ….. for young and old alike.
6) … is defined as any device that provides instantaneous, uninterruptible power.

3. Answer the questions:

1) Is hydropower an old or a new industry?
2) Why is it cost-effective?
3) What factors does it depend on?
4) Are the installation costs high or low?
5) What are the benefits of hydropower?
6) Why is it affordable source of electricity?
7) Prove that hydropower is a renewable source of energy?

4. Watch video Pumped Storage Hydropower and mark the sentences True/False: https://www.energy.gov/eere/water/pumped-storage-hydropower

1) PSH is a type of hydroelectric energy storage.
2) It is a configuration of two water reservoirs at different elevations that can generate power as water moves up from one to the other (discharge), passing through a turbine. PSH acts differently from a giant battery, because it can store power and then release it when needed.
3) PSH was first used in the United States in 1930.
4) PSH currently accounts for 95% of all utility-scale energy storage in the United States.
5) With closed-loop PSH, reservoirs are connected to an outside body of water.
6) Pumped-storage hydropower is the most dominant form of energy storage on the electric grid today.

5. Speak upon the topic Pumped Storage Hydropower"

CHAPTER 4. ALTERNATIVE SOURCES OF ENERGY
UNIT 9. RENEWABLE ENERGY

I.Preparation

Before reading study the following vocabulary:

replenished
conduction band
density variation
constitute
decrease
emissions
to rely on
capacity
commissioning
sustainable

II. Reading Text

Renewable energy

Those sources of energy that are replenished by a natural process after being used are renewable energy sources. These sources are solar energy, wind energy, geothermal energy, bioenergy (biomass, biogas, and biodiesel), geothermal energy, and hydro energy. Almost all these renewable energy sources exist because of the sun. Solar PV uses the solar irradiance to kick out the electrons from the valance band to the conduction band that constitutes the electric current. Wind energy exists owing to the bumpy heating of the earth's surface causing density variation.

Wind energy

The terms "wind energy" and "wind power" both describe the process by which the wind is used to generate mechanical power or electricity. This mechanical power can be used for specific tasks (such as grinding grain or pumping water) or a generator can convert this mechanical power into electricity.

A wind turbine turns wind energy into electricity using the aerodynamic force from the rotor blades, which work like an airplane wing or helicopter rotor blade. When wind flows across the blade, the air pressure on one side of the blade decreases. The difference in air pressure across the two sides of the blade creates both lift and drag. The force of the lift is stronger than the drag and this causes the rotor to spin. The rotor connects to the generator, either directly (if it's a direct drive turbine) or through a shaft and a series of gears (a gearbox) that speed up the rotation and allow for a physically smaller generator. This translation of aerodynamic force to rotation of a generator creates electricity.

Wind power is the most efficient technology to produce energy in a safe and environmentally sustainable manner: it is zero emissions, local, inexhaustible, competitive and it creates wealth and jobs.

Spain has been one of the leading, pioneering countries in exploiting the wind to produce electricity. Thirty years after installing the first wind turbine in the country, Spain became the first country in the world to rely on wind energy as the main source of electricity for an entire year (2013, with 20.9 % of total production). This also established Spain as an advanced country in terms of technological solutions that allow integration of wind energy into the grid.

Botiieve is the largest wind power plant in Ukraine with a total capacity of 200 MW, which is almost half of the total wind power capacity in the country. It is located in Zaporizhia Oblast. Its construction began in 2012 and was completed in 2014. The plant includes 65 WMs with a unit capacity of 3.075 MW. Projected average annual wind power generation is 686 million kW·h. At the time of commissioning, Botiieve WPP was one of the top five largest wind power plants in Central and Eastern Europe.

✍ After-text exercises

1. Insert the appropriate word or word combination from the text:

1) It would be tough to rely on 100% wind power. Instead, wind has to be … with other sources of energy.
2) The spinning blades turn … that connects to a generator Lots of electricity comes from spinning things – water or steam spinning a turbine, for example, that turns a shaft that goes to a … .
3) What wind speed is said to be necessary to make large wind energy systems economically …?
4) Wind power produces energy in a safe and environmentally …. manner.
5) Spain became the first country in the world …wind energy as the main source of electricity.

2. Answer the questions:

1) What is renewable energy?
2) What is the principle of wind energy?
3) Why is wind energy environmentally-friendly?
4) What country is a pioneer in exploiting the wind to produce electricity?
5) Is wind energy popular in Ukraine?
6) What are the disadvantages of wind energy?

3. Fill in the table:

Sources of renewable energy	**Type of energy**	**Principle**
sun	Solar energy	
wind		
water		
earth		

4. Speak upon wind power plants in Ukraine.

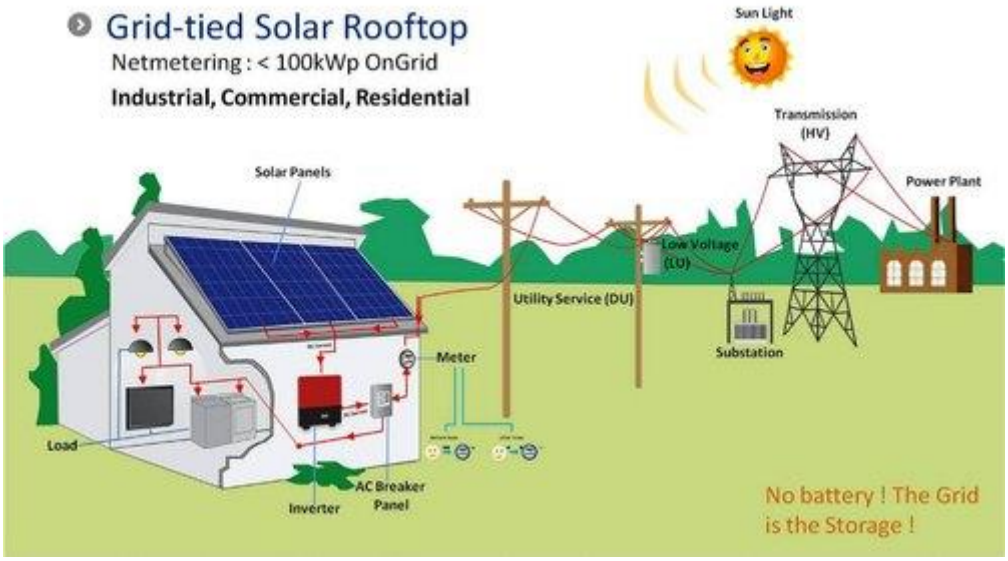
UINIT 10. SOLAR ENERGY

I. Preparation

Before reading study the following vocabulary:

to reflect
crucial
affordable
research
solar farm
powerful sources
to install
alternating
to feed into

II. Reading Text



The sun is one of the most powerful sources of natural energy on our planet and it has produced it for millions of years!

Solar energy is the sun's rays that reach the Earth. It has been said that one hour of sunlight gives enough energy to power the whole word for a whole year!

Solar energy can be converted into other forms of energy, such as heat and electricity. When converted to thermal (or heat) energy, solar energy can be used to heat water (for use in houses, offices, swimming pools, etc) and spaces (inside houses, greenhouses, etc). Solar energy can be converted to electricity in to ways:

Solar cells change sunlight directly into electricity. They are used to power watches, calculators, radios, road signs, etc. Solar power stations catch the sun energy by using thousands of wide mirrors. The solar mirrors collect as much sunlight as possible and heat a fluid which produces steam. The steam is used to power the generator. Solar energy is everywhere the sun shines. It's by far the Earth's most available energy

source. It's free. It's a renewable energy, which means it will never run out and is naturally reproduced. It creates neither air nor water pollution.

Big Plans for Solar Power

The Sahara, in North Africa, is the largest desert in the world. The sun in the Sahara is twice as it is southern Europe. Scientists say that just 0.3% of the light will be enough to build a huge solar farm in the desert.

The Vatican is the smallest country in the world but it's going solar in a big way. It intends to become the first solar-powered state in the world! Many roofs in the Vatican have already been covered with solar panels even Pope Benedict's home! The Green Pope said that the Vatican is going to build the largest solar power station in Europe!

Research is being done to place solar farms over the ocean (which make up 70% of the Earth surface) and build the first space-based solar power station.

There is a very bright future for solar energy to power our transportation needs. Solar-powered cars, buses, planes and ships are no longer a dream!

Solar energy systems come in all shapes and sizes. Residential systems are found on rooftops across the United States, and businesses are also opting to install solar panels. Utilities, too, are building large solar power plants to provide energy to all customers connected to the grid.

Concentrating solar-thermal power (CSP) systems use mirrors to reflect and concentrate sunlight onto receivers that collect solar energy and convert it to heat, which can then be used to produce electricity or stored for later use. It is used primarily in very large power plants.

The cost of solar panels depends on the number of panels and how/where they are installed, but generally, solar power is becoming more affordable every year. Solar power is the crucial future production method in the move to clean energy, and as economies of scale drive prices down, its importance will only increase. Photovoltaic cells in a solar panel turn sunlight into direct current electricity (DC). Then, an inverter converts the DC electricity into alternating current electricity (AC), and once this process has taken place, the electricity is used, fed into the grid or stored in a battery.

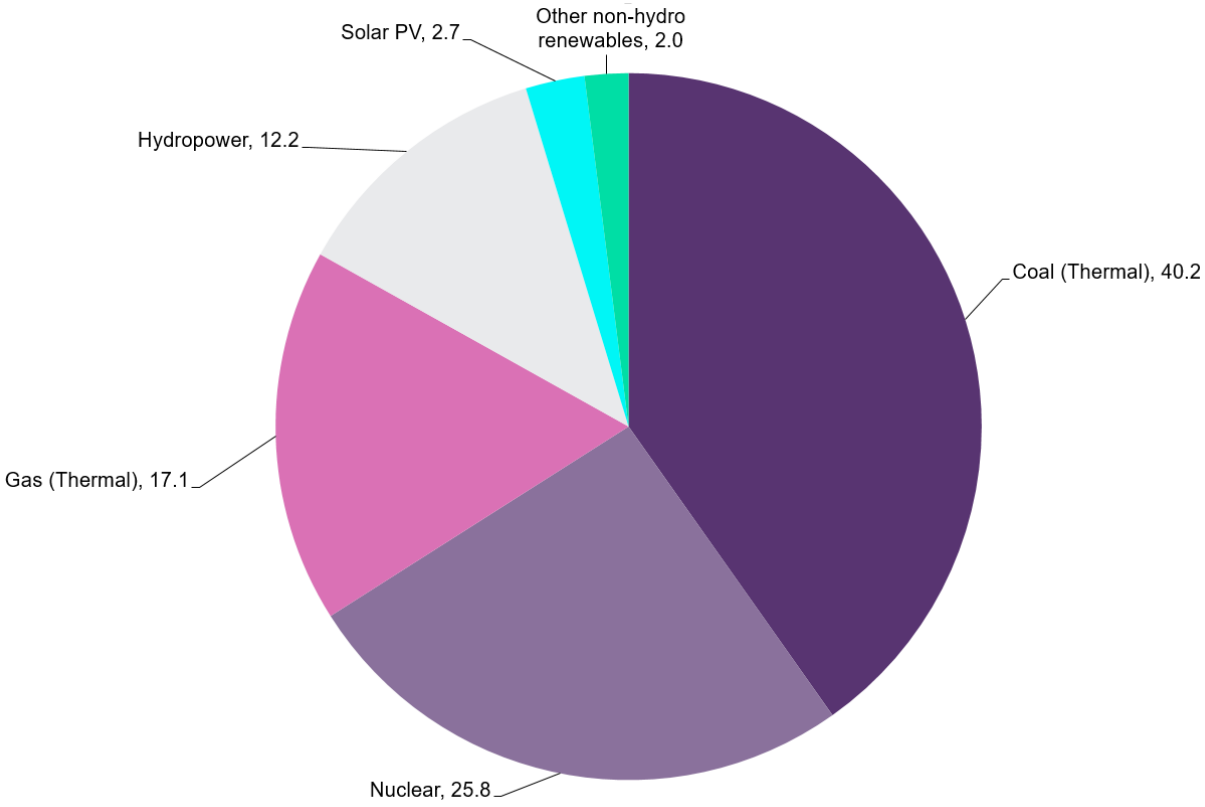
Solar energy industry is also growing in Ukraine. In 2018 new installed PV systems reached 211.0 MW compared to 2017 according to Global Market Outlook.

✍ After-text exercises

2. Answer the questions:

1) What is solar energy?
2) Why is Solar Power good for the planet?
3) How can it be used?
4) Is solar energy cost-effective or not?
5) What are the perspectives of solar energy in Ukraine?

3. Analyze the pie chart «Energy sources in Ukraine»:



3.Quiz «Renewable energy»:

1) A material that does not allow heat to pass through easily is a(n)
    b) Friction
    c) Conductor
    d) Insulator
    e) Magnet
2) Energy resources that, once used, can replenish themselves and can be used again and again are called:
    a) Non-renewable
    b) Renewable
    c) Finite
3) What is another term used to mean renewable?
    a) Sustainable
    b) Finite
    c) Infinite
4) Energy resources that, once used, cannot be replaced are called:
    a) Non-renewable
    b) Renewable
    c) Finite
5) What is another term used to mean non-renewable?

a) Sustainable
b) Finite
c) Infinite

6) Which of the energy sources listed is NOT a renewable source of energy?
   a) Solar
   b) Wind
   c) Oil
7) What type of energy source is formed from fossilised plants and is found sandwiched between other types of rock in the Earth?
   a) Oil
   b) Coal
   c) biomass
8) What is the name given to the source of energy created with the burning of decaying plant or animal waste?
   a) Geothermal
   b) Biomass
   c) Nuclear
9) Estimates from international government organisations suggest that if the world's demand for fossil fuels continues at its present rate, they may run out within some of our lifetimes. How long is the world's supply of oil meant to last for?
   a) 30 years
   b) 50 years
   c) 70 years
10) Which energy source is derived from the movement of sea water in and out of turbines to generate electricity?
   a) Wind
   b) Tidal
   c) Hydro-electric power
11) What does wind directly turn to generate electricity?
   a) Generator
   b) Motor
   c) Turbine
12) Which of these is a disadvantage of hydroelectric power?
   a) It is very reliable
   b) There are no fuel costs
   c) Dams destroy the habitats of estuary species

4. Speak upon the pros of renewable energy

UNIT 11. ENERGY-SAVING SOLUTIONS

I.Preparation

Before reading study the following vocabulary:

appliances
breakthroughs
energy consumption
highly insulated
to interact
incandescent bulbs
developing new foam insulation
emission combustion burner
to ensure
sustainable

II. Reading Text

8 Energy-Saving Solutions on the Horizon

From heating and cooling to electronics and appliances, it takes a lot of energy to power our daily lives. Our homes use 37 percent more energy today than they did in 1980. But without energy efficiency -- through technology innovation and federal energy conservation standards -- this number would be a lot higher. In fact, even though our total energy use has grown, our energy use per household is down about 10 percent, despite that our homes are larger and contain more devices.

Thanks to breakthroughs by our National Labs, industry and academia, equipment we use in our homes is more energy efficient than ever before, saving consumers money and slashing carbon pollution. Let's take a look at a few technologies we can expect to see in the marketplace within the next few years that will make our homes even more sustainable.

1. SMARTER, MORE CONNECTED HOMES

We live in an increasingly connected world -- the same is true for our homes. New electronic devices and appliances can now be linked to the Internet to provide real-time data that makes it easier to understand and lower energy use.

Soon these technologies will be more cost effective and smarter as a result of a project supported by the Energy Department's Building Technologies Office. New wireless sensors developed at Oak Ridge National Laboratory will boost home energy efficiency through automated control systems for heating and cooling units, lighting and other systems that access data such as outside air and room temperature, humidity, light level and occupancy all at a fraction of a cost of typical wireless sensors you see on the market today. Pacific Northwest National Laboratory, National Renewable Energy Laboratory and Lawrence Berkeley National Laboratory are also developing new protocols and standards that will improve how smart appliances communicate with each other and interact with the electric grid.

2. ULTRA-EFFICIENT HEAT PUMPS

The Building Technologies Office is ushering in the next generation of heat pump systems, which warm and cool your home by moving heat from one space to another. These include:

1) A fuel-fired, multi-function residential heat pump that can reduce primary energy consumption by 30 percent.
2) A natural gas heat pump and air conditioner that uses an ultra-low-emission combustion burner and other equipment to provide home heating, cooling and hot water.
3) A low-cost gas heat pump designed to reduce heating costs by 30 to 45 percent compared to conventional gas furnaces and boilers.

3. CARBON-FIGHTING CLOTHES DRYERS

The same concept behind heat pump technologies that keep your home comfortable can also be used for another important application: drying your clothes. Oak Ridge National Laboratory and General Electric are developing a new type of clothes dryer that uses a heat pump cycle to generate hot air needed for drying. The result: a more efficient dryer that has the potential to lower energy consumption by 60 percent compared to conventional ones on the market today.

4. MAGNETIC REFRIGERATORS (THAT'S RIGHT, MAGNETS)

Oak Ridge National Laboratory and General Electric have teamed up to create a revolutionary new type of refrigerator that uses magnets to create cold, also known as the magnetocaloric effect (lowering or raising the temperature of material by changing the magnetic field). For the past 100 years, refrigerators have relied on a process called vapor compression that uses coolants which can be harmful to the environment. The new refrigerator is a revolutionary technology that uses a water-based cooling fluid, making it better for the environment and more efficient, which means lower energy bills and less carbon pollution.

5. ADVANCED WINDOW CONTROLS

Lawrence Berkeley National Laboratory and Pella Windows are working on new highly insulated windows that use sensors and microprocessors to automatically adjust shading based on the amount of available sunlight and the time of day to ensure proper lighting and comfort, saving consumers energy and money.

6. NEXT-GEN INSULATION

Insulation is one of the most important ways to reduce your home heating and cooling costs. The Industrial Science & Technology Network is developing new foam insulation made with environmentally friendly and advanced composite materials that ensure heat doesn't escape from the attic, walls and other areas of the home during cold winter months.

7. REFLECTIVE ROOFING MATERIALS

Cool roofs coated with materials containing specialized pigments reflect sunlight and absorb less heat than standard roofs. Expect these types of roof systems to get even "cooler" due to new fluorescent pigments developed by Lawrence Berkeley National

Laboratory and PPG Industries that can reflect nearly four times the amount of sunlight of standard pigments.

8. BRIGHTER, BETTER LIGHTING

LEDs (light emitting diodes) have come a long way, with today's highest-performing lights consuming 85 percent less energy than incandescent bulbs. The Building Technologies Office's Solid State Lighting Program supports research and development to lower the cost of LEDs, while making them even more efficient and long lasting. In fact, LED efficiency is expected to double from the current 125-135 lumens per watt to 230 lumens per watt in the next few years as result of continued R&D.

(From: https://www.energy.gov/articles/future-home-tech-8-energy-saving-solutions-horizon)

✍ After-text exercises

1. Insert the appropriate word or word combination from the text:

1) … capture thermal energy at relatively low temperatures (cold source), warm it and transfer it to a heat sink.
2) Retrofitting simply means adding a coating to your roof that has …properties.
3) … is one of the most important ways to reduce your home heating and cooling costs.
4) The new refrigerator is a revolutionary technology that uses a water-based cooling fluid, making it better for the environment and more…, which means lower energy bills and less carbon pollution.
5) … is today's most energy-efficient and rapidly-developing lighting technology.

2. Match the technologies with their process description:

1.MAGNETIC REFRIGERATORS	a) The idea here is that they will adjust the level of shading, level of sunlight and various other relevant factors.
2. CARBON-FIGHTING CLOTHES DRYERS	b) The principle of this cycle uses a heat-transfer fluid – in contact with the magnetocaloric materials (MMC) – flowing from the cold side to the hot side when the MMC is heated (magnetised), and from the hot side to the cold side when the MMC is cooled down (demagnetised).
3. SMART WINDOWS	c) The idea here is that the appliances and systems in the home will work in synch through automated control technology.
4. SMARTER, MORE CONNECTED HOMES	d) Instead of high-energy consuming dryers that gulp utility expenses, this new dryer uses a heat pump cycle to produce hot air.

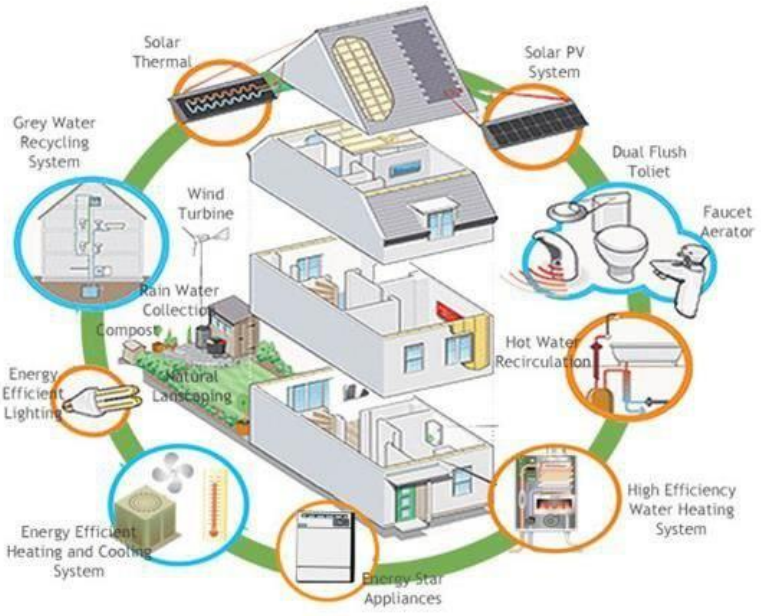
3. Saving Energy quiz:

1. Which of these is an effective way to improve energy efficiency for air conditioning?

a) Using portable heaters as well as air conditioning
b) Dressing for the seasons: heavier in winter and lighter in summer (correct)
c) Opening doors and windows when heating is on
d) Turning the air conditioning higher than needed to help it warm up quicker

2. Which of these types of bulbs are the most efficient?
   a) LED (correct)
   b) Incandescent
   c) CFL
   d) Halogen
3. Why is using an energy management system effective?
   a) It enables you to monitor individual users' energy usage and penalise them for any wastage
   b) It enables you to schedule energy audits so employees are prepared to reduce their usage during the audits
   c) It cuts energy consumption in half by automatically setting equipment to energy-saving settings
   d) It enables you to effectively configure equipment and track energy usage throughout the building (correct)
4. Why should you analyze the building itself during an energy audit?
   a) To see if extra overhead lighting can be installed
   b) To check for areas from which draughts are originating (correct0
   c) To make sure it is presentable
   d) To ensure all windows are closed at all times
5. How much heating and cooling energy can strategically planted trees save?
   a) Up to 20 % (correct)
   b) Up to 15 %
   c) Up to 30%

4. Look at the picture and give comments about energy-efficiency in smart homes:



UNIT 12. INNOVATIONS IN THE ENERGY SECTOR OF UKRAINE

I.Preparation

Before reading study the following vocabulary:

consumption
energy storage
nuclear industry
implementation
self-sufficient
to accelerate
reduction
to overcome difficulties
to foresee
to decrease
demand for
to contribute
to emphasize

II. Reading Text

On April 30, the ENERGY CLUB held an online meeting of the Ukrainian energy industry-leading stakeholders. The purpose of the meeting is to discuss the introduction of innovations, which is especially important in the context of the energy crisis.

Business representatives shared their vision of solutions for painful problems, such as an imbalance in the production/consumption of electricity, lack of energy storage sector, the crisis in the nuclear industry, and so on. Also, the rectors and scientists of leading universities in Kharkiv, Dnieper, Kyiv, and Ivano-Frankivsk spoke at the online conference.

The energy departments of universities not only train professionals for the future of modernized and transformed energy but also actively participate in the development and implementation of innovations necessary for the Ukrainian economy.

Mikola Savitsky, a doctor of technical sciences and professor of the Prydniprovska State Academy of Civil Engineering and Architecture, outlined the main social processes that need to be considered today when developing sustainable energy:

- **Decentralization** (administrative-territorial reform). The term "self-sufficient territorial community" introducing, which concentrates all the processes of social change;
- **Deurbanization** is a reduction in the population of large cities and their production potential (the process has already begun in developed countries). A global pandemic will accelerate the transition from urbanization to deurbanization;

- **Renewable energy development**. Stable energy is green energy.

How to modify the energy sector or what to do when the Ukrainian energy crisis? One of the most effective tools to overcome difficulties is the introduction of innovations in the energy industry. For example, digitalization and cybersecurity are just some of the main points of innovation. Recall that today Ukraine one of the leading countries in the number of cyberattacks on the energy system.

The first decisive steps must be taken in three directions:

- the formation of a balancing electricity market;
- introduction of the mechanism of energy decentralization;
- the creation of small distributed generation, small energy cooperatives.

Innovations in the Solar Energy Sector

As to solar energy, CEO Avenston Dmytro Lukomskyi noted that despite the rapid increase in capacity over the past few years, the development of this segment occurred without any innovation from Ukraine. Ukrainian companies completely repeated the processes that took place outside our country. It's time to think about the transformation of this sphere and the implementation of our innovations.

«In Ukraine, solar energy developed rapidly enough, new capacities tripled annually. But the market was regulated by the only mechanism of state support by a green tariff. Unfortunately, not everything was foreseen, and today we have many problems. The de facto development of the solar energy market in Ukraine has stopped. Many owners of solar power plants faced with non-payments for the supplied electricity and shutdown due to a decrease in demand for electricity.

State support is an effective tool but not eternal. The market must become efficient, and technology must develop independently. Innovation and technological development around the world contribute to lowering the cost of solar energy and increasing its economic efficiency.

In Ukraine, the payback period for solar power plants for self-consumption is less than 10 years, with a lifetime of 20-25 years. According to forecasts, the cost of traditional electricity will increase, therefore, when taking into account the energy independence of both individual enterprises, and the country as a whole, you can see many incentives for the development of solar energy. So the number of projects for self-consumption will increase even without the green tariff» said Dmytro Lukomskyi.

And yet, speaking about market efficiency and innovation, Dmytro Lukomskyi especially emphasized that it is important to reckon with those projects that already built. Large industrial solar power plants still have unresolved issues, both technical and financial.

The introduction of forecasting systems will be a useful innovation for large industrial power plants, will make it possible to make predictions of the insolation level, and effectively regulate the PV-generation. Another working solution is the introduction of energy storage systems. According to Dmytro, reducing the cost of energy storage systems will be a powerful impetus for renewable energy development.

What holds back the development of the energy storage sector?

Answering channel 112's question about what is holding back the development of the energy storage sector, Dmytro Lukomskyi pointed out the high cost of equipment: «It is necessary to stimulate the implementation of these projects. Otherwise, the development of energy storage in Ukraine will occur rather slowly. Businesses are not interested in investing heavily in relatively expensive technology. There are two options: wait until energy storage technologies become cheaper and become effective in our market, or introduce state support mechanisms to stimulate the implementation of such projects» remarked Dmytro Lukomskyi.

Social, environmental, and economic processes all over the world are lead mankind to the decentralization and self-sufficiency of the territorial communities. The world will change, and traditional energy will cease to exist. And solar energy will take its place of honor in the future energy system!

(From: https://avenston.com/en/articles/innovation/)

✍ After-text exercises

1. Insert the appropriate word or word combination from the text:

1) He … 100 dollars to the charity.
2) Yearly sales … by five percent.
3) …is the capture of energy produced at one time for use at a later time to reduce imbalances between energy demand and energy production.
4) He wanted …. (to us) that he hadn't meant to offend anyone.
5) That standard, which defines how much ozone is unhealthy, was set in 1997, but its…. was delayed by legal challenges.
6) Many voters want to see some …. of the deficit.
7) He finally managed … his fear of flying.

2. Match the words with their definitions:

1. implementation	a) urgent need
2. self-sufficient	b) to grow progressively less (as in size, amount, number, or intensity)
3. sustainable	c) something that is used or done to deal with and end a problem
4. contribute	d) the process of making something active or effective
5. solution	e) able to maintain oneself or itself without outside aid
6. consumption	f) involving methods that do not completely use up or destroy natural resources
7. decrease	g) the use of something

8. demand	h) to give (something, such as money, goods, or time) to help a person, group, cause, or organization

3. Answer the questions:

1) What social processes should be considered today when developing sustainable energy?
2) What are the main points of innovation?
3) Why has solar energy market in Ukraine stopped?
4) What is the payback period for solar power plants for self-consumption in Ukraine?
5) What holds back the development of the energy storage sector?
6) Will traditional energy be in a demand in the future?

4. Speak upon the innovations in the energy sector of Ukraine

APPENDICES

GLOSSARY OF TERMS IN HEAT POWER ENGINEERING

1. **available power shortage of a power system** – дефіцит наявної потужності енергосистеми
2. **adjust – настроювати, регулювати**
3. **amplifier** – підсилювач
4. **board** – плата, пульт, панель
5. **capacity** – місткість, об'єм
6. **capacitor** – конденсатор;
7. **clamp** – затискач
8. **coolant** – охолоджувач
9. **control unit** – панель управлення
10. **cost of kWh not supplied** – вартість недоданої електроенергії у кіловатах;
11. **conductivity** – електропровідність
12. **customer of an electricity supply organization** – абонент енергопостачальної організації
13. **decentralized heat supply** – децентралізоване теплопостачання
14. **emergency state –** аварійний режим
15. **energy utilization efficiency** – коефіцієнт корисного використання енергії;
16. **energy efficiency** – енергоефективність;
17. **energy efficiency increase** – збільшення ефективності
18. **energy carrier** – енергоносій
19. **energy saving operation of a power system** – енергоощадне функціонування енергосистеми
20. **endurance test** – випробування на витривалість;
21. **fault location** – визначення місця пошкодження;
22. **fuel rods** – стрижні палива
23. **gear** – шестерня;
24. **national grid** – державна електроенергетична система
25. **hydroelectric power station** – гідроелектростанція;
26. **heat supply** – теплопостачання;
27. **heat storage** – теплонакопичувач;
28. **heating well** – нагрівальний колодязь;
29. **lightning conductor** – блискавковідвід;
30. **line circuit-breaker** – головний вимикач;
31. **load recovery** – відновлення навантаження;
32. **load**-breaking isolator – вимикач навантаження;
33. **load curve of a consumer's power plant** – графік навантаження енергоустановки споживача;
34. **load duration curve of a consumer's power plant** – графік тривалості навантаження енергоустановки споживача
35. **lubricant** – мастило;

36. **manual drive** – ручний привод;
37. **maintenance expenses** – вартість технічного обслуговування
38. **malfunction** – збій
39. **multi-terminal circuit** – багатополюсник;
40. **measuring relay** – вимірювальне електричне реле;
41. **nuclear power station** – атомна електростанція;
42. **opening, tripping** – вимикання, розмикання;
43. **on-off switch** – вимикач;
44. **operational earthing** – експлутаційне заземлювання;
45. **output terminals of a network** – вихідні затискачі схеми;
46. **output** – потужність;
47. **operating power reserve of a power system** – експлутаційний резерв потужності енергосистеми;
48. **power system dispatching** – диспетчерське керування енергосистемою;
49. **polyphase** circuit – багатофазне коло;
50. **primary voltage** – первинна напруга;
51. **renewables** – джерела палива, що відновлюються;
52. **run out** – закінчуватися;
53. **sampling test** – вибіркове випробування;
54. **secondary winding** – вторинна обмотка;
55. **sealed transformer** – герметичний трансформатор;
56. **saving of organic fuel -** економія органічного палива;
57. **short circuit** – коротке замикання;
58. **stable mode** – усталений режим;
59. **standby mode** – режим очікування;
60. **standby power** – енергоспоживання в режимі очікування;
61. **state variables of a power system -** змінні стану енергосистеми;
62. **strain insulator** – анкерний ізолятор
63. **transmit** – передавати, посилати;
64. **trim** – підлаштовувати;
65. **TRS** – Транзистор;
66. **turbine blades** – лопатки турбіни;
67. **wind power engineering** – вітроенергетика;
68. **ultimate energy technologies** – кінцеві енергетичні технології;
69. **unavoidable energy** – енергія вимушеного використання;
70. **Winding – обмотка**

COMMON PHRASES USED IN ACADEMIC TEXTS

Актуальний up-to-date (важливий/популярний сьогодні), relevant, pressing, urgent (нагальний), …is/are of great
importance today, is/are currently of great interest (*типова помилка:* actual; *уникайте:* topical)
Актуальність significance, importance, relevance (*уникайте:* actuality, topicality)
Анотація abstract

Важливий significant, important
Визначити define (дати дефініцію), determine (дату тощо),
identify, indicate, outline, specify (особливості)
Виконувати (див. "здійснювати")
Виникнення the rise, emergence, appearance, origin (походження)
Висвітлити (тему, проблему) cover, describe, report on, highlight
Висновки conclusion
Виявити identify (визначити), show, find out, reveal, discover
(відкрити щось нове)
Відзначати note, stress (наголосити на ...)
Відповідний relevant
Вітчизняний (тобто український) Ukrainian (*типова помилка:* native, domestic)
Вплив impact (сильний вплив), effect (effects), influence (довготривалий)
Вивчено... The article explores (examines) … *Можливий варіант у пасивному стані:* ... is/are explored (examined)
Визначено особливості... The specific features of … are outlined
Визначити основну думку (причини) identify the main argument (the causes)
Висвітлено проблему ... The issue concerning … is highlighted
Виходячи з досвіду ... Judging by the experience of … On the basis of …
Виявлено.... … is/are found out
Відповідно, ... Accordingly, …
В контексті ... within **(**in) the context of …, from the perspective of …, in relation to …
В умовах … in/under the conditions of …

Головну (основну) увагу приділено... Particular (special) attention is paid (drawn) to… The author focuses on …

Даний (цей) **...** this …, the present …, the current
Діяльність activities (*типова помилка:* activity, це – активність)
Дозволити (дати можливість) make it possible to …, enable, permit
Доповідь report
Дослідження research (наукове вивчення взагалі)**,** study
(конкретна наукова розвідка, наукова стаття), case study (конкретне дослідження)
Досліджувати study, analyze, explore, examine (*типова помилка:* research)
Досягнення (у значення "прогрес") advances in …

Детально описано … is/are described in detail
Доведено факт ... The author has established the fact that …
Доведено, що... it is shown that … The author shows (demonstrates) that … The author argues that …
Досліджено... The paper/author explores… (examines …, studies…, investigates…, describes …, considers …). *Можливий варіант у пасивному стані:* **...** is/are explored (examined, etc.)

Зазначено, що... The author states (shows, points out, explains, indicates, develops the view) that … It is claimed that …
За цих умов (обставин) under these conditions (circumstances)
Звернути увагу на ... draw attention to …
Здійснене дослідження the study, this study (*типова помилка:* the conducted study)
Здійснювати дослідження conduct a study
Зображено... is shown (demonstrated)
З позиції ... from the standpoint of …
Зроблено спробу визначити .... An attempt is made at identifying (defining) …
Закономірності laws, regularities, a regular pattern
Застосовувати apply (метод, правило, теорию), use (використовувати: наприклад, матеріал)
Збірник (наукових праць) journal
Здійснювати perform (оцінювання), conduct (дослідження, аналіз)
Значення (важливість) importance, significance, implications, relevance
Зокрема more specifically, particularly

Ключові слова keywords (key words)
Коло проблем a number of issues, a whole range of, wide variety of
Конкретний specific, particular

Лежати в основі underlie

Наведено аналіз ... The article provides an analysis of … The article provides a detailed examination of …
Наведено дані про ... Data are given about …
Наведено приклади ... This article provides examples of … …gives examples showing…
Наведено характеристику... … is/are described
На підставі (на основі, на базі)... considering …, drawing on …, proceeding from …, having analyzed …, … is based on …
На початку / наприкінці (80-х. pp. XX ст.) in the early / late 80s of the 20th century (1980s)

На прикладі (на матеріалі ...) the case of, by …ing, proceeding from, having analyzed …, … is based on …, using … as an example (*Типова помилка:* by the example of …)
На сучасному етапі at present
Наголошувати emphasize, stress
Назва (статті) (research paper) title
Напрям line, trend, direction, research area (напрям наукових досліджень), the main activities, the area of activities (напрям діяльності), policy

Обґрунтований justified
Обґрунтовувати justify**,** give a rationale for …, substantiate
Обґрунтування main arguments, justification, motivation
Обсяг (матеріалу, роботи) the scope
Огляд overview (огляд проблем), survey, the literature review (огляд літератури)
Окреслити (намітити) outline
Описати describe
Опитування survey
Основний main, principal, major, key
Особливості characteristic (specific, distinctive) features, characteristics (peculiarities означає "щось незвичне")
Охарактеризувати describe (описати, дати характеристику), identify (визначити), characterize as … (охарактеризувати як ...)
Охоплювати cover (певний обсяг роботи з наголосом на повноту охоплення), encompass (певні теми з наголосом на додатковий характер інформації)
Окреслено коло питань стосовно ... is/are … highlighted
Окреслено характерні риси... Characteristic features of … are outlined
Описано ... The paper/author describes (offers a description of…). *Або:* ... is/are described
Особливу увагу приділено ... Particular (special) attention is paid to… The paper concentrates on … focuses on ... Extensive coverage is given to … Much attention is given to …
Охарактеризовано... The author explores (describes, examines, analyzes)… is/are described (identified)

Питання (проблеми) issues, problems (*типова помилка:* questions)
Підхід до approach to
Повідомлення, повідомляти report
Показати show, demonstrate, indicate
Поняття concept
Попередні дослідження previous research, research publications
Постановка проблеми problem statement, research justification
Пояснення (наукове) interpretation

Пояснити explain, demonstrate, illustrate, argue, explicate, elucidate, interpret
Праця (наукова) study, paper, research publication, work (не про свою роботу)
Представити present, provide
Причина cause (те, що спричинило щось), reason (підстава, мотив)
Проаналізувати analyze, explicate
Проблеми problems (те, що потребує вирішення), issues (теми, що розглядаються)
Прокоментувати interpret (матеріал, дані)
Пропозиція suggestion (ідея для розгляду),
Пропонувати suggest (ідею для розгляду), offer (щось конкретне), propose
Піднімати питання ... raise the issue of …
Показано вплив... The influence (impact, effect) of … on … is shown
Показано значення... The importance (significance) of .. for …is stressed
Показано на прикладі (проілюстровано**) ...** is exemplified by
Пояснити на прикладі ... illustrate by …ing
Представлено огляд... This paper presents a review of …
Проаналізовано особливості... characteristic (specific, distinctive) features of ... are analyzed. *Або:* The author analyzes … (presents/provides an analysis of …)
Проблему розглянуто шляхом ... The study investigates this issue by examining …
Проведено (здійснено) дослідження... (*див.* **Досліджено**)

Розв'язати проблему find a solution to the problem
Розглядаються проблеми... The issues addressed are …
Розглянуто... (У статті розглянуто...) The paper deals with …This article discusses the issue of... The study is concerned with … The paper describes … The paper is concerned with … The author considers … *Або:* … is (are) described (discussed, considered, etc.)
Реалізувати ідею implement an idea
Результати results, findings, outcomes
Резюме (короткий виклад змісту статті) summary
Розглядати discuss, describe, consider, study, explore, cover, investigate, view (treat)… as … (розглядати щось як...) метод
Розкрити show, describe, find, demonstrate, explain, unfold, reveal (*помилка:* disclose)
Розробити develop (теорію), design (план)
Розробка research, study (наукова діяльність, праця), development, elaboration (ідеї)
Розуміння insight into… (розуміння наукове), scientific interpretation (розуміння проблеми)

Світогляд world-view, world outlook
Світоглядний world-view, relating to world outlook, philosophical, ideological

Соціокультурний socio-cultural
Специфіка specific features (nature, character) (*типова помилка:* specificity)
Спостерігати observe, study
Стан дослідження state of research
Стаття (наукова) article, paper, study
Стосовно relating to
Суттєвий considerable
Сучасне суспільство contemporary society
Сучасний present, present-day, current (нинішній), modern, up-to-date (такий, що відповідає вимогам часу), contemporary (того ж часу, про який ідеться)
Сучасність our time (*уникайте:* contemporaneity)
Систематизовано й узагальнено... … is/are systematized and summerized
Стаття присвячена питанням... The article is devoted to…
The article deals (is concerned) with… The paper touches upon the issue of… The study addresses the problems of … *уникайте:* dedicated to …)
Стисло описано ... is/are described in short
Сфера досліджень the field (area) of research

Творчість creative work (творча діяльність), works (доробок науковця, митця, письменника)
Тези доповідей conference reports, summaries, abstracts of reports
Тези доповідей (збірник) proceedings of the … conference
Тлумачення explanation

Узагальнити generalize (отримані результати), summarize (інформацію з попереднього досвіду, з прочитаної літератури)
Установити find out (з'ясувати), identify, demonstrate, prove
Установлено місце та роль... The position (place) and role of … are identified
Установлено факт … The author has established the fact that…
Уточнено... is/are specified

Характеристика (опис) description, outline
Характерний specific
Характерні риси (див. "особливості")

Явище phenomenon (множина: phenomena. *Типова помилка:* phenomenons)

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Навчально-методичне видання

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ПРОФЕСІЙНО-ОРІЄНТОВАНИЙ ПРАКТИКУМ ІНОЗЕМНОЮ МОВОЮ

Практикум для здобувачів ступеня вищої освіти магістра
спеціальності «Теплоенергетика»
освітньо-професійної програми «Теплоенергетика»

Рецензент *С. В. Іваненко*
Відповідальний за випуск *С. В. Іваненко*
Коректор *О. Ф. Александрова*