

Krystian Olek, Grzegorz Krzos

# Skills Needed for Working in the Automated Green Energy Sector



Publishing House of Wrocław University of Economics and Business

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# Introduction

The essence of the competencies necessary to work in the automated green energy sector is described, and an example of its practical application and the path that must be followed to acquire a given competency is presented.

In recent years, the green energy sector has become one of the most popular topics undertaken in the world of business and science. Thanks to the development of renewable energy technologies and the growing demand for electricity not only among highly developed countries but also in the Third World, the issue of green energy has become an essential element of broadly understood teaching activities (training, fields of study, social campaigns promoting renewable energy sources). Implementing technological solutions in the automated green energy sector requires having the necessary competencies to understand its essence and impact on the natural environment, and also as the economics of producing energy in an alternative way. In the literature on sustainable development, there is also the so-called concept of green jobs, i.e. positions in sectors related to environmental protection (Sulich et al., 2020), which include employees of the green energy sector.

Automation in the green energy sector is becoming increasingly common, so employees must be prepared to work in a robotic environment. This study aims to present the most critical competencies that employees who want to work or are working in the green energy sector should have. This manual provides a description of the ten most essential competencies necessary to perform work properly in the industry discussed, as well as examples of their practical application in market conditions. The textbook is intended primarily for pupils, students, employees, and entrepreneurs in African countries, but its universality and utilitarian nature allow for its global use.

The competencies necessary to work in the automated green energy sector are crucial in the context of the growing importance of renewable energy. The dynamics of this sector require not only technical skills from employees, but also the flexibility of thinking and readiness to improve constantly. Combining knowledge with practice, technical and social skills is the foundation of success in this dynamically developing field. Progressing digitalization, automation, and new technologies require employees to adapt and frequently update their knowledge and skills (Zaphiris and Ioannou, 2018). The use of new devices, computer programs, and mobile apps supports work efficiency and makes it easier to perform (Oberländer et al., 2020).

Competencies should be understood as knowledge, skills, potential, and attitudes that enhance effectiveness at the individual and organizational levels. Knowledge is acquired through education and observation, while skills result from the regular use of expertise or abilities. Abilities are the potential to perform specialized activities, while behaviour is an employee's reaction to specific situations (Armstrong, 2006). Boyatzis (2006) defined competencies as

## 1. Introduction

the employee's abilities, manifested in workplace actions and measured by the actual effects achieved in this position (the effects are the basis for assessing the employee and making decisions about employment/dismissal or promotion).

This manual describes competencies closely related to the automated green energy sector, divided into technical, business, and ecological awareness and sustainable development.



## Technical Competencies

Technical competencies in the renewable energy sector are the skills and knowledge necessary to design, build, operate, and maintain renewable energy generation and distribution systems. They mainly concern the following areas.

### 2.1. Knowledge about Technologies for Producing Renewable Energy Sources

This is the first and most crucial competence a job applicant or an employee of the automated renewable energy sector should have. The most popular technologies for producing renewable energy sources are photovoltaics, wind turbines, water turbines, biogas plants, geotherms, and solutions based on hydrogen. Note that in addition to specialist knowledge regarding technology, installation, maintenance, and repairs, the employee must first acquire know-how in the field of occupational health and safety because each of the technologies mentioned above involves numerous risks and threats that may affect the health and life of employees in a given sector.

Popular photovoltaics requires, first of all, knowledge of the principles of operation of photovoltaic cells, the materials from which they are produced, and their technical parameters. Then, the employee must know how to install individual system elements at a point and convert the energy produced in the panels into 'usable energy'. The aspects of the photovoltaic system are cells, often called panels. This inverter changes direct current into alternating current, overvoltage protection, a cell assembly system, electric cables, and a bidirectional counter. In practice, an employee working on photovoltaic installations should select individual system elements tailored to the user's needs, design and implement the installation, check the operation, and assess the efficiency of the installation.

In the case of wind turbines, the employee must know and understand the principles of the units' operation, as well as their types (propeller, drum, carousel, rotor, vertical, etc.) and characteristics. An essential competence regarding wind systems should be knowledge about optimal locations for installing a wind turbine – related to meteorology, anemology, and geomorphology.

Similarly to the types of renewable energy technologies described earlier, in water technologies, employees should have specialist knowledge of water installation diagrams and types of water turbines (Francis, Kaplan, Pelton, Tesla, and Shintake turbines). Additionally, knowledge of hydropower, hydrology, and oceanology is also necessary.

Biogas and biomethane plants are also frequently used electricity production systems that allow the management of organic waste and biomass. This alternative energy production requires knowledge of different biofuels and technologies for converting them into energy, from biogas

## 2. Technical Competencies

to liquid biofuels. In practice, these competencies are mostly used to manage the process of converting biomass into energy and maintaining the efficiency of the process in the long term. Knowledge of biotechnology, agronomy, and chemistry is important here.

Geothermal systems, in which energy extraction and use are based on various types of heat pumps (vertical and horizontal collectors), are among the most effective energy sources. The locations of geothermal power plants depend primarily on their place on the world map. African countries have particularly favourable conditions for exploiting geothermal energy. In this case, in addition to specialist geo-energy knowledge, knowledge of geology and hydrology is essential.

The last renewable energy technology described here is a hydrogen power plant, which, after many years of research, has been used in practical applications worldwide. The ability to produce hydrogen from various materials makes it possible to use this technology in almost every location in the world. Even waste and plastics which have been heavily polluting the natural environment for years can produce hydrogen (so-called turquoise hydrogen). Knowledge of the construction of hydrogen power plant systems is very specialized, and in the coming years it may be very desirable, as the development dynamics of the hydrogen industry are incredibly high. Practical skills will be mainly used in operating devices in a hydrogen power plant and monitoring their parameters. Engineering and chemical knowledge are necessary here as well.

Both residents and entrepreneurs in African countries can use the renewable energy technologies described. Their successive emergence in this region of the world could pose a significant challenge to the education sector at all levels. Building awareness of pro-ecological production and energy use from green sources should occur at the beginning of the educational journey of young Africans. The following stages of learning should provide the opportunity to acquire specialist knowledge that can be implemented in professional work, from secondary school to higher education, as well as supplementary courses and training.

### 2.2. Automation in the Renewable Energy Sector

Automation enables the continuous monitoring and effective management of the energy network. Thanks to advanced systems and technologies, it is possible to collect data from various points in the network, analyse parameters, and identify irregularities and failures.

Competencies related to automation and control systems for renewable energy installations consist of understanding the automation of processes used in renewable energy, such as the SCADA system, monitoring and control systems.

The SCADA system is one of the most popular computer systems used to monitor, collect, and analyse data from various electricity production installations, allowing to control production processes in real time. It consists of three elements that together enable the automation of the manufacturing process, including:

- field devices that collect data from installations or power plants using many sensors placed at individual production stages. These devices transmit information to the central system;
- industrial computers, i.e. programmable logic controllers (PLC), that allow to control devices creating power plants, and also using machine learning algorithms, enable to automate processes through machine learning based on measurements and data from field devices;



### 2.3. Competencies Related to Programming and Data Analysis

- an interface that allows the user (an employee in the green energy sector) to read information about the state of production processes and changes in power plant parameters expected by this user. Most often, interfaces take the form of mobile apps or information screens. The interfaces have data visualization systems, control parameters, and alarm information about deviations from production standards.

Many tools allow remote access to automated systems for supervising and managing power plants producing energy from renewable sources, and take the form of web and mobile apps where the user has a current view of the operating parameters of the production system.

## 2.3. Competencies Related to Programming and Data Analysis

Programming and data analysis are other skills that, in addition to the technical side of creating energy production systems from renewable sources, allow for work in the industry. IT/ICT technologies are increasingly used in renewable energy power plants and play a vital role in managing and controlling devices in green power plants, such as solar panels, wind turbines, and energy storage systems. Moreover, through data analysis, the programs optimize the operation of individual devices to obtain the highest possible efficiency of the entire system.

In programming systems and apps, dedicated programming languages are used, such as:

1. Python is a high-level programming language appreciated for its readability, clarity, and flexibility. It offers many features that make it easy to write complex codes quickly. Python has an extensive library of modules, making it easy to develop apps without writing codes from scratch, allowing to integrate ready-made solutions rapidly. Moreover, Python is portable and runs on multiple system platforms so that the code can be easily transferred between different operating systems. Thanks to open source codes, Python is constantly being improved by a community of programmers who, due to their skills, expand the possibilities of using the language. In the renewable energy sector, Python is used in data analysis, management, and creating control and optimization algorithms in renewable energy sources. LabVIEW uses graphical programming, creating programs by combining blocks of functions in graphic icons, the so-called „virtual instruments“ that represent operations, functions, or measurement devices. In the renewable energy industry, this language is used to control and communicate with various measuring devices, robots, and PLC controllers, creating transparent and easy-to-interpret information for the user about the operating parameters of individual power plant elements.
2. C/C++ are languages used for embedded programming in controllers and devices that control processes in renewable energy plants. C/C++ is also used to create mathematical models for alternative energy production systems, which enable forecasting the efficiency of installations and conducting advanced simulations enabling research, testing, and analysis of new solutions in renewable energy (similar to the MatLAB programming language).
3. JavaScript, traditionally used in web browsers to create interactive websites, can also be used in the renewable energy sector for various purposes, e.g. to create user interfaces that allow operators to monitor and control renewable energy installations. One can visualize data, charts, alarms, and control systems via a web browser. This can be used to create

## 2. Technical Competencies

interactive charts, graphics, or maps that present data on the efficiency and effectiveness of renewable energy installations thanks to communication and interaction with Internet of Things (IoT) devices. Mobile apps for individual users of photovoltaic or wind installations are often created using JavaScript.

4. SQL (Structured Query Language) is used to create and manage databases where information about energy production from power plants is stored. This allows to perform advanced database queries to analyse data regarding the efficiency, trends, forecasting, and reporting of the performance of renewable energy installations. SQL is also used to implement database security, such as authorization, authentication, and data access rights management.

What should be done in order to acquire a given competence?

The path of learning programming languages that can be used in the green energy sector depends on what a person wants to do. If the goal is to create interactive websites, then it is necessary to learn JavaScript, while if someone wants to make software that processes large amounts of data from power plant equipment, they should focus on PYTHON.

Learning to program begins with familiarizing oneself with basic programming concepts and structures, such as data types, operators, control instructions, functions, loops, and conditions. In the next step, the student should learn more complex programming patterns, e.g. objects, polymorphism, design patterns, unit testing, and object-oriented programming. The student chooses then specializations and furthers his/her knowledge of the selected programming techniques and languages. One can prepare for the profession of a programmer at secondary school, university, and postgraduate studies, as well as training and courses organized by specialized units. It is also worth using alternative learning sources, such as the Internet or social networking sites, where experienced programmers often provide support in individual learning.

Technical competencies are the basis for operation in the automated renewable energy sector. Depending on the specific nature of the work performed, the competence structure should be adapted to it. People dealing with infrastructure and power plants should focus on strictly developing technical skills such as constructing machines and devices, energy, and automation. In turn, those who want to build power plant management systems should focus on acquiring IT/ICT competencies. In both cases, an inherent element is learning specialized English, which is required at a very high level in both hardware and software.



## Business Competences in the Automated Green Energy Sector

These competencies are another category of skills that, apart from technical knowledge, constitute the foundation for the effective operation of employees in the green energy sector. The energy business is based on having several different types of competencies, allowing the creation of new solutions in the industry, practical cooperation and communication with internal and external stakeholders, and broadly understood management of energy industry enterprises by legal acts that strictly regulate the manner of running an enterprise and protect health and life of employees in this industry. Moreover, the energy industry is characterized by high innovation, requiring numerous research and development projects, necessitating the employment of project managers with knowledge and skills in project management.

### 3.1. Energy Company Management

Management is based on implementing four primary functions of the manager's daily activities. The first and most crucial function is planning, i.e., the stage at which goals and resources are defined to achieve these goals. During planning, employees of energy companies in the green sector are assigned their responsibilities and the principles they should follow when carrying out their tasks are explained. Management tools such as a Gantt chart, commonly called a work schedule, are often used at the planning stage. Tasks are assigned attributes such as contractor, duration, necessary resources, and implementation priority. The second management function is organizing the required resources identified at the planning stage. Here, the manager must collect organizational resources in the appropriate quantity and quality by the principle of rationality. When discussing corporate resources, one should include the following: financial, material, human, and the most important intellectual and information, which in the energy industry determine the company's innovativeness. The third management function is to motivate employees to work effectively. The appropriate selection of motivation techniques is an essential skill of a manager, which, combined with knowledge of other management techniques and industry knowledge, allows for achieving the goals intended at the planning stage. Motivation can take two forms: financial, where employees are influenced using material resources, and non-financial, where the incentive to work efficiently is primarily the possibility of professional development and recognition. The last of the management functions, namely the control function, consists in the ability to properly check the results obtained by employees while performing the tasks entrusted to them. Control should be continuous, which means subordinates should be controlled during the entire process and not only at the end of work.

The competencies described below characterize a complete manager who can efficiently and effectively manage an enterprise.

### 3. Business Competences in the Automated Green Energy Sector

Management of an energy company can be carried out at three levels:

- a) Operational level, where the manager manages the work of executive employees. This level is characterized by short-term management, where the formulated goals are implemented quickly, i.e. in a week or a month. An example of a position held by a manager is team leader or foreman. Delegating tasks most often concern routine and repetitive work for executive positions.
- b) Tactical level, where the manager defines tasks for line managers and independent positions. The goals are medium-term, which in practice usually translates into a quarter or up to one year. A tactical manager is often called a middle manager because he/she carries out tasks assigned by top management and is responsible for dividing these tasks among his subordinates. An example of a tactical level manager position is head of the energy network maintenance department or regional sales representative for renewable energy sales.
- c) Strategic level, where experienced managers make long-term decisions regarding the direction of the company's development for the coming years. These decisions have a horizon ranging from three to even ten years. Strategic managers set goals that allow the organization to develop and gain competitive advantages. In the energy sector, these decisions often concern expanding transmission networks, increasing production capacity, and creating innovative solutions through research and development. Positions held at the strategic level include operational director, financial director, etc.

**Table 1.** Katz's competency model

Type of competency/ level in hierarchy	Technical	Social	Conceptual
Operational	60%	30%	10%
Tactical	33%	33%	33%
Strategic	10%	30%	60%

Source: own elaboration.

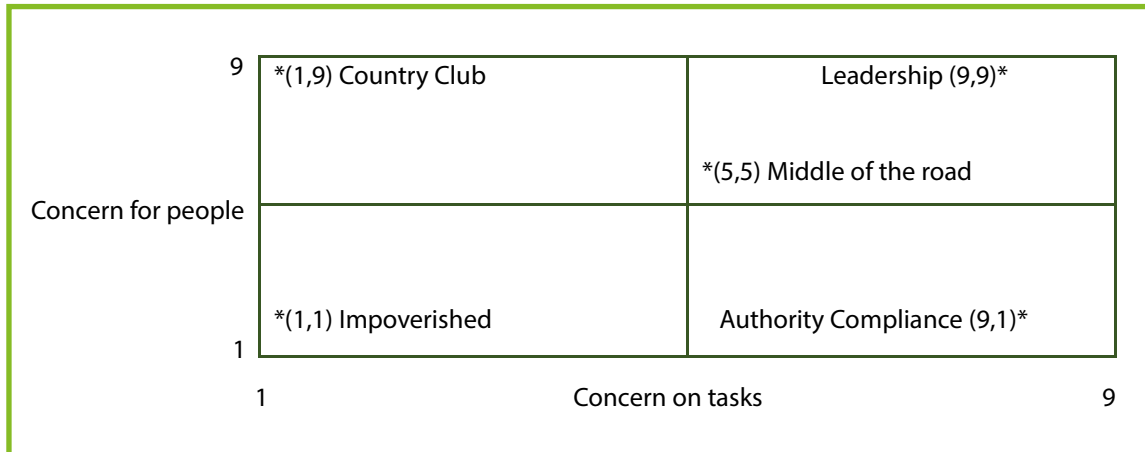
The structure of managerial competencies at individual levels was well described by the model created by R.L. Katz (2009), who distinguished three closely integrated types of skills: technical, social, and conceptual. Table 1 presents the structure of these competencies, regarding the management hierarchy.

## 3.2. Leadership in the Energy Industry

Leadership is another essential element related to a company's management in the renewable energy industry. Leadership should be understood as the ability to inspire employees to work by building authority and creating a vision that directs action. A good manager who can achieve goals by effectively motivating and inspiring others to act, releasing positive energy, and being willing to work effectively with his subordinates is an effective leader (Nawaz and Khan, 2016).

Managers can use different leadership styles depending on the organization's needs and the manager's predispositions. Leadership styles were described by Todăriță (2021), who, based on the achievements of Blake and Mouton, presented a grid of styles (see Figure 1).

### 3.2. Leadership in the Energy Industry



**Figure 1.** Blake and Mouton's leadership style grid

Source: own elaboration based on (Todăriță, 2021).

The structure of the grid is based on two dimensions that characterize the direction of the manager's attention. He/she may focus on the set goals or on his/her subordinates, i.e. the human factor. The strength of orientation to a given dimension, described on a scale of 1-9, allows to identify a specific leadership style, which may be:

- 1) focused solely on people – the so-called democratic or country club style – characterizes a manager who pays attention primarily to the needs of his/her employees, trying to provide them with comfortable working conditions, taking into account their opinions in the decision-making process, often forgetting about their work efficiency. In the company, a manager is liked among employees and has informal authority (resulting from the employees' acceptance of a given manager as a superior) but does not always have formal authority (resulting from his position in the company);
- 2) focused solely on tasks, i.e. autocratic style. In this case, the manager focuses exclusively on the tasks performed by subordinates and their work efficiency, and forgets about his/her employees' needs and good atmosphere at work. The manager makes all decisions, disregarding the suggestions and opinions of the subordinates. He/she often has only formal authority and needs to be recognized by employees (lack of informal authority);
- 3) not oriented towards people or tasks, a passive style (often called impoverished). In this case, the manager is not interested in employees and the results of their work. He/she minimizes own efforts and commitment to work, and only wants to maintain the position in the organization. The manager blames the team itself for the failure of the team's work, claiming that the employees made the decisions themselves. Such a manager has no formal or informal authority;
- 4) highly people-oriented, while taking care of the implementation of tasks, i.e. leadership style. The manager tries to build a great work atmosphere and inspire people to do it effectively, and believes that understanding the purpose of work by employees and the sense of fulfilling the organizational mission among them is the best way to achieve high work effects. The most desirable style on the labour market, representing a manager who has formal and informal authority;

### 3. Business Competences in the Automated Green Energy Sector

- 5) both people and task-oriented, but without the element that characterizes a good leader, namely a balanced style. This is an intermediate variant between democratic and autocratic, characterized by the manager's moderate involvement in caring for working conditions, employee morale, and the results of their work. Such a manager achieves the intended goals, which could be more ambitious and satisfying for the organization but allows to maintain safely his/her position. The manager has formal and informal authority, but his employees will not "follow him/her into the fire," as in the case of a leader. The best skill of a manager is the ability to adapt a given style to organizational conditions and the specific nature of the work performed there. This leadership is called situational leadership, which is variable. This requires extensive experience and knowledge on the part of the manager. This knowledge can be acquired already at the stage of secondary vocational school with an economic profile, and then it can be developed during business studies and supplementary postgraduate studies. Participation in management training and workshops experienced business practitioners conduct is also extremely valuable.

To check your approach to people management, see Appendix 1, which presents a leadership style test developed by Blake & Burton, along with the interpretation of its results.

### **3.3. Ability to Cooperate, Communicate with Internal and External Stakeholders, and Analyse the External Environment**

Functioning in the rapidly changing environment of the energy industry requires managers to be able to analyse behaviour and communicate with market entities with which the company cooperates or influences its operations.

The way we communicate reflects on the company as a whole. It reflects company values, culture, traditions, employees, and their affiliation to the organization or the ambitions the company strives for. It builds the image among the employees it employs and those who want to join the company, as well as the contractors it cooperates with or could potentially cooperate with.

Building a communication system that will quickly and reliably share information inside and outside the organization is challenging. A well-transmitted message gives the sender a sense of certainty that it arrived at the right time and has not been distorted along the way, whilst to the recipient it brings a sense of understanding and the opportunity to provide feedback.

In communication within the organization, the most crucial goal is to inform employees about their tasks and issues related to the organization's policy and build a community within the organization. More and more often, this communication is digitalized (e.g. using an internal messenger). Communicating effectively allows managers to build positive relations with employees, helps to resolve conflicts, effectively identify employees' needs, and support their professional development. Through appropriate communication, the manager becomes a leader of positive changes.

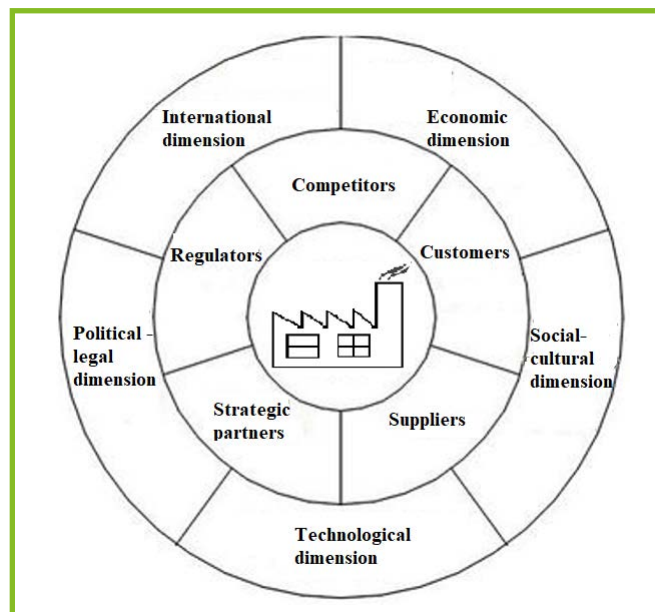
In external communication, the company tries to present its organization in the best possible light for customers, suppliers, the labour market, and the local community. To do this, it must use various communication tools adapted to the specific market segment it wants to

### 3.3. Ability to Cooperate, Communicate with Internal and External Stakeholders...

reach. Marketing departments or external marketing companies are responsible for external communication. The selection of external units to conduct activities for the parent company is called outsourcing.

In recent years, marketing has moved from traditional channels to the virtual world, where modern society spends more and more time. Instead of leaflets and newspaper articles, companies advertise on the Internet. The primary and most effective online channels are auction portals, social media (Facebook, Instagram, TikTok, etc.), and industry portals and communities like LinkedIn. It is also worth emphasizing the role of marketing innovations, such as the activities of influencers, who, thanks to their popularity and extensive media reach, can quickly reach many potential customers with information about a given company's offered range of products.

A competent employee of the automated green energy sector responsible for the management or supporting the management process should be able to conduct market analyses. In a world of intense competition, the behaviour of one energy producer triggers a quick reaction from another. Competitive advantages are built by better adapting the product range to customer requirements, lower prices, better quality of customer service, and introducing innovations. One of the tools supporting analysis, primarily of the external environment, was created by R.W. Griffin, who presented the essential elements of the organization's internal and external environment – see Figure 2.



**Figure 2.** Griffin's organizational environment model

Source: own elaboration based on (Griffin, 2021).

The model divides the organizational environment into internal (describing the essential components of the organization, i.e. employment structure, most important assets, prevailing culture and ownership structure, and management staff) and external. The external environment is divided into closer sections, task-related and also general. The task environment describes the essential entities the organization cooperates with daily: customers, suppliers, competitors, regulators, and strategic allies. In turn, the general environment is defined by the dimensions of the environment that apply to all entities operating on the market, including:

### 3. Business Competences in the Automated Green Energy Sector

- technical dimension, which describes the latest technologies that can be used in the industry,
- economic dimension, which describes the financial situation in the sector and the entire economy (usually through macroeconomic indicators such as inflation, interest rate, GDP, unemployment, etc.),
- socio-cultural dimension, which includes trends in consumer behaviour and changes in demographic structure,
- political and legal dimension, where information is presented on the stability and transparency of the law, trends in their changes, and the policy approach to the issue of renewable energy sources,
- international dimension, where countries' membership in economic unions, possibilities of goods and services flow, mobility of labour between countries, and opportunities resulting from membership in a union or associations (e.g. the possibility of obtaining subsidies or duty-free export/import) are described.

Analysis of the organizational environment helps in the decision-making process, especially those of a strategic nature. Knowledge of analysis tools is beneficial in the organization management process, especially in situations of high variability, where it is necessary to quickly and appropriately adapt to market conditions.

### **3.4. Competence Related to the Management of Innovative Projects and Related Entrepreneurship in the Renewable Energy Production and Distribution Sector**

A high level of innovation characterizes the renewable energy sector. This is primarily due to the growing requirement for energy from environmentally friendly sources not based on fossil fuels, i.e. hard coal, gas, and oil. As well as being limited, fossil fuels emit carbon dioxide into the atmosphere, thus generating a carbon footprint. Support for developing green energy technologies by international organizations and governments of most countries causes enterprises and small market innovators/startups to attempt to implement risky but very innovative research and development projects.

Implementing these projects requires the employment of a manager who has knowledge of project management tools, techniques, and methods and can use them in practice. Therefore, the role of the project manager, who is responsible for building the team, the course, and the partial and final results of the energy innovation project, becomes crucial. In addition to creating innovations, the energy industry implements many infrastructure projects that involve the construction of green energy production facilities or infrastructure for its transmission or storage.

A project is a unique, temporary, multidisciplinary, and organized undertaking to prepare value within predefined requirements and constraints. The condition for achieving the project goal is compliance with the requirements, including many constraints such as time, cost, resources, and standard quality (IPMA, 2006). In turn, project management is the application of knowledge, skills, tools, and techniques to project activities in order to meet their requirements (PMI, 2017).

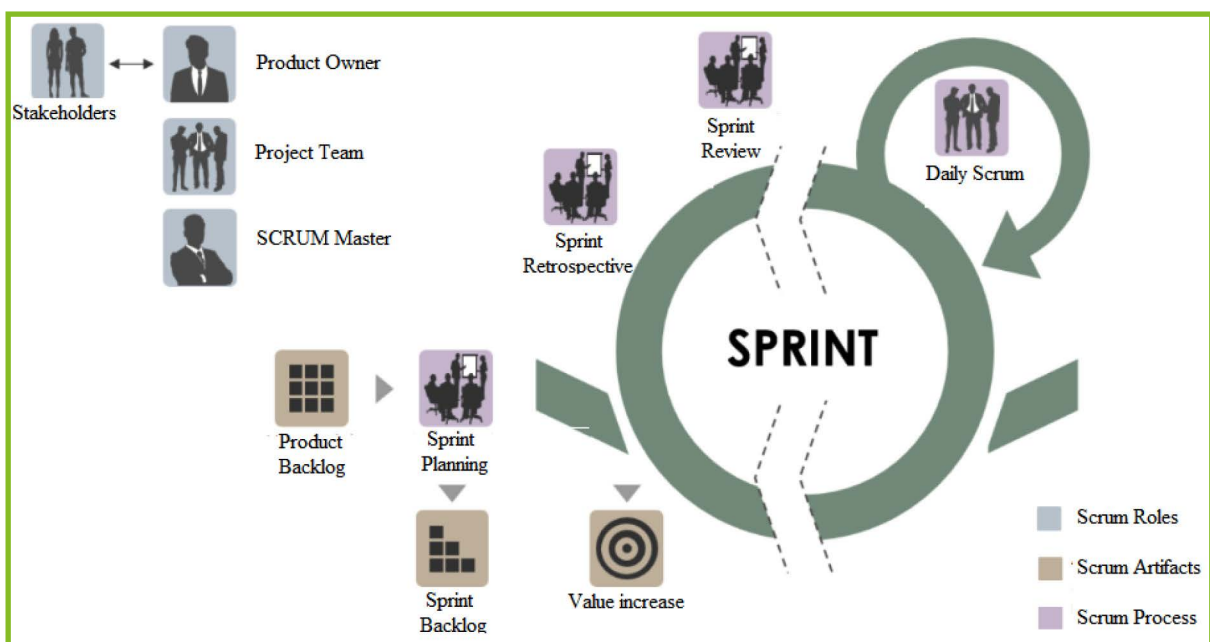


### 3.4. Competence Related to the Management of Innovative Projects and Related Entrepreneurship...

When managing innovation projects, adopting appropriate tools, techniques, and methods that correspond to the specific nature of creating innovations is essential. Then, using agile management methodologies, e.g. SCRUM or, in the case of IT/ICT projects, Extreme Programming (XP), is required.

Schwaber and Sutherland (2017), the creators of the SCRUM methodology, define it as “a framework in which people can solve complex problems while delivering products of the highest possible value productively and creatively.” By defining SCRUM in this way, the creators want to emphasize the possibility of using various techniques and tools together with SCRUM processes, which is a massive advantage of this methodology over traditional ones that are linear and inflexible. This works exceptionally well when, at the beginning of the project, the user’s requirements are not fully specified and frequently modified, which is typical of innovative projects.

SCRUM is an iterative and incremental model that delivers the current version of the created value in a short time (Akif and Majeed, 2012). Incremental design means the organic development of the product being developed (Nerur et al., 2005), which is based on iterations of tasks until the product of a given task is considered final (Ozkan and Kocuk, 2016). This is extremely valuable from the user’s point of view, who receives tangible results of the design team’s work and the opportunity to make suggestions for further improvements, which helps avoid errors in the final product. The Scrum methodology is built on three main components: roles, processes, and artifacts, see Figure 3.



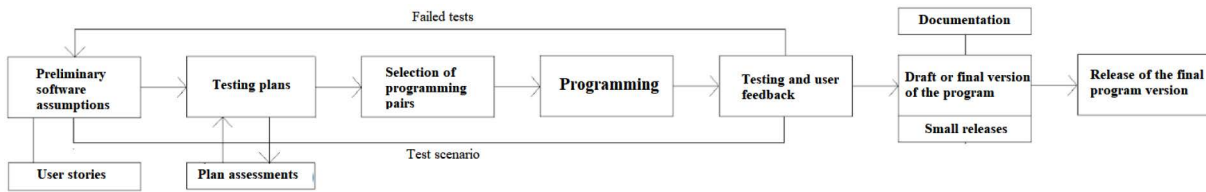
**Figure 3.** The SCRUM process

Source: own elaboration using the Visual Paradigm published drawing program.

Extreme programming is an approach to software development that is based on creating frequent releases (versions) of software in very short time intervals (timeboxing) (Cobb, 2011). The “light methodology,” as the creators call it, is dedicated to small teams of a maximum of several people that need to quickly create software in an environment with unclear or rapidly

### 3. Business Competences in the Automated Green Energy Sector

changing customer/user requirements (Beck, 1999). XP is distinguished from other agile software development methodologies by one fundamental difference, namely a strong emphasis on the technical side of the project. The method diagram is described in Figure 4.



**Figure 4.** Product development process by XP

Source: own elaboration based on (Beck, 1999).

In turn, infrastructure projects in the green renewable energy production sector are implemented using classic management methods and techniques, which include:

- a) PMBOK (Project Management Body of Knowledge) is not strictly a management methodology but a standard covering best practices and experiences that can be applied in the project management process. Project managers should conduct projects according to the principles described in Table 2.

**Table 2.** Characteristics of the principles addressed to project managers of their teams included in PMBOK 7

Name	Characteristics
<i>Stewardship</i>	Conscientious action that is full of respect and care for the organizational environment
<i>Team</i>	Building a team of people able to cooperate with each other and maintain good relations with the external environment
<i>Stakeholders</i>	Effective involvement of stakeholders in the project implementation process
<i>Value</i>	Taking the team's actions to create value as a guide
<i>Systems thinking</i>	A holistic view of the project implementation as a system combining various aspects
<i>Leadership</i>	Presenting the attitudes of a leader leading the team to success.
<i>Tailoring</i>	Continuous adaptation of activities to the changing conditions of project implementation
<i>Quality</i>	Focus on quality as an element included in processes and created products
<i>Complexity</i>	Adapting project activities and work to respond to challenges related to its complexity
<i>Risk</i>	Adjustment of actions aimed at eliminating/neutralizing risky situations
<i>Adaptability and resilience</i>	Building the ability to return to a state quickly enables effective project implementation due to quick adjustments to disturbances occurring in the project implementation process
<i>Change</i>	Readiness for changes in a turbulent environment to achieve the intended results

Source: own elaboration based on (PMI, 2017; San Cristobal, 2017).

- b) The PRINCE2 methodology, similar to PMBOK, is a project management standard that divides each project into managed and controlled stages. Thus, controlling and estimating costs and implementation time of complex projects are much more accessible. This is

### 3.4. Competence Related to the Management of Innovative Projects and Related Entrepreneurship...

also influenced by the hierarchical organizational structure of the project team, which favours a clear division of duties and responsibilities for individual areas of the project. This approach is so flexible that it can be used in almost any situation. PRINCE2 is also based on its principles that are intended to support project management, including:

- continuous business viability – the project should be checked on an ongoing basis in terms of the viability of its further implementation;
  - using professional experience – which should accompany the project team throughout the project;
  - defining roles and responsibilities within the organizational structure, taking into account the interests of all project stakeholders, namely sponsors, users, and suppliers should be effectively represented in the project management team;
  - stage management, which, in terms of management functions, should consist in planning, ongoing monitoring, and control at each stage of the project;
  - management based on using tolerances that are included in the deviations from specific project implementation parameters manifested in its intermediate and final goals;
  - focus on products that are clearly defined in the project in terms of quality and quantity;
  - adapting the project to external conditions, often unidentified and disturbing its progress during project implementation.
- c) IPMA (International Project Management Association) has as its essence the assumption that the leading and irreplaceable resources in implementing all types of projects are people, and attention should be focused on them. Regardless of existing methodologies, such as PRINCE2 or good project management practices (PMBOK), people and their competencies determine the value of organizational resources resulting in the success of project implementation. The most important Project Manager competencies have been assigned to the three project, program, and portfolio management areas: perspective, people, and practice – see Table 3.

**Table 3.** IPMA ICB 4.0 Individual Competence Guidelines

Competencies		
Perspective	People	Practice
<ol style="list-style-type: none"> <li>1. Strategy</li> <li>2. Management governance, structure and processes</li> <li>3. Compliance, standards and regulations</li> <li>4. System of forces and interests</li> <li>5. Culture and values</li> </ol>	<ol style="list-style-type: none"> <li>1. Self-reflection and self-management</li> <li>2. Internal consistency and reliability</li> <li>3. Interpersonal communication</li> <li>4. Relations and commitment</li> <li>5. Leadership</li> <li>6. Teamwork</li> <li>7. Conflict and crisis</li> <li>8. Entrepreneurship and creativity</li> <li>9. Negotiations</li> <li>10. Results orientation</li> </ol>	<ol style="list-style-type: none"> <li>1. Defining the project/program/ portfolio</li> <li>2. Requirements, goals and benefits</li> <li>3. Scope</li> <li>4. Time management in the project</li> <li>5. Project organization and communication</li> <li>6. Quality</li> <li>7. Finance</li> <li>8. Resources</li> <li>9. Orders, contracts and cooperation</li> <li>10. Planning and control</li> <li>11. Risk</li> <li>12. Stakeholders</li> <li>13. Change and transformation</li> <li>14. Selection and optimization</li> </ol>

Source: own elaboration based on (IPMA, 2015).

### 3. Business Competences in the Automated Green Energy Sector

Depending on the specific nature of the project in the green energy sector, the project manager's role is crucial in achieving the project's success or failure. Knowledge of project management techniques and methods is an inherent attribute of an efficient and effective manager.

In addition to project management techniques and methods, the manager must have the knowledge and ability to build project teams effectively. A complete team means employing people with the appropriate technical qualifications and, what is equally important, with predispositions to work in a group. While it is easy to verify technical competencies (graduate school and other forms of education, certificates, recommendations, etc.), it is much more challenging to check the personality predispositions that enable people to work in a group or not. A specialized tool developed by the famous psychologist, T. Hartman, is particularly suitable here. Thanks to the extended test, it helps managers in the process of selecting appropriate employees for teams – the test and the discussion can be found in Appendix 2.



## Competences Related to Ecological Awareness and Sustainable Development

Environmental awareness includes several competencies and attitudes that allow people to make conscious and responsible decisions related to environmental protection and sustainable development. In the modern production and distribution of the green energy industry, these are the basis for the activities of all their employed there. The awareness that one is doing work that affects the ecological safety of the region, country, and the world, motivates conscientious employees of the sector to work effectively. Environmental awareness is reflected in the attitudes and behaviour of people who actively participate in counteracting the degradation of the natural environment. Ecologically-aware people are convinced that the state of the natural environment depends on human activity. It is also essential to understand the relations occurring in nature and to respect its laws, which enables adequate environmental protection, thus preventing potential ecological disasters. Ecological knowledge is the key to maintaining the balance of nature and ensuring its sustainable preservation for future generations. An environmentally-aware employee will:

- know local and global problems and threats occurring in the natural environment;
- make appropriate choices in private and professional life, taking into account long-term environmental consequences;
- reduce to a minimum the consumption of raw materials and other materials necessary for the operation of their company, and will segregate and recycle post-production waste;
- educate less ecologically-aware employees in and out of their place of work; they will actively inform others of good practices protecting the natural environment;
- actively participate in social initiatives organized for environmental protection, such as cleaning the city or company premises;
- search for new solutions to the problem of environmental degradation by acquiring knowledge and implementing it at work.

In 2015, the leaders of 193 UN countries prepared the document “Transforming Our World: Agenda 2030 for Sustainable Development”, which is the foundation of the principle of sustainable development. The 17 UN Sustainable Development Goals identify the critical challenges of today regarding people, the planet, prosperity, peace, and partnership. The main goal of the principle of sustainable development is to build a better world that is beneficial for all inhabitants of our planet.

Sustainable development is a set of actions to achieve simultaneous growth in its three dimensions: economic, social, and environmental. In the economic dimension, one can talk about promoting business through ecological protection and caring for local communities. Such a business generates not only an economic effect but also influences environmental indicators

#### 4. Competences Related to Ecological Awareness and Sustainable Development

and improves the social situation of the local and regional community. Good practices include, purchasing green energy, installing pollen filters on factory chimneys, closed-circuit waste management, and employing the local community or socially excluded people. In addition, it supports the population's quality of life by facilitating access to education, healthcare, and other essential services. The fundamental principles of sustainable development include:

- sustainable economics: promoting an economy that takes into account the long-term consequences of economic activities while the minimizing negative impacts on the environment,
- social justice: ensuring social equality, dignity, and development opportunities for all people, eliminating social inequalities and providing access to basic needs,
- environmental protection: preservation of natural resources, minimizing pollution and damage to ecosystems, and care for biodiversity,
- sustainable lifestyle: cultivating behaviour and habits that reduce the consumption of natural resources, minimize the negative impact on the environment, and promote health,
- participation and cooperation: enabling public participation in decision-making regarding development, collaboration of various sectors and communities in activities for sustainable development,
- long-term perspective: focusing on the long-term effects of our actions, rather than short-term profits, while maintaining a balance between current and future needs,
- sustainable use of resources: rational and practical use of natural resources, minimizing of waste, as well as their optimal use,
- education and awareness: increasing public awareness about environmental issues and the necessity to initiate measures for sustainable progress, education is the key to changing attitudes and habits.

To check the level of knowledge about environmental protection and sustainable development, see Appendix 3, which includes a knowledge test to determine the level of awareness on these topics.



## Summary

Functioning in the automated green energy sector requires its employees to acquire a set of competencies that contribute to efficient and practical work. Efficiency, in turn, translates into achieving high results and the development of the industry. Employees can be divided into two categories that complement each other in the sector's activities. Technical workers are needed to create innovative solutions, provide ongoing operation of power plants, service the micro-installations they install, and maintain energy transmission or storage lines. Staff involved in the energy business administration are responsible for preparing contracts with customers, administrative services, and marketing promoting the sector's products and services. In turn, employees managing enterprises or teams involved in the implementation of energy industry projects try to ensure the continuity of the activities of other people employed in the industry. They set goals, plan activities, organize the resources necessary to achieve these goals, motivate their subordinates, and control the results of their work.

Each of these professional groups requires employees to command a set of different tools that are necessary to work in their profession. In African countries, the renewable energy sector is just developing, which creates employment opportunities for their population. Just like the innovative energy industry, the related education system is also growing. This manual contains basic information about selected competencies and how to acquire them. What is important here is, above all, creating ecological awareness among the youngest generations of Africa, who may find employment in the rapidly developing sector. Building pro-ecological awareness and knowledge of the effects of pro-ecological activities will translate not only into the professional life of the African population but also into everyday life. The additional materials included in the textbook in the form of tests, exercises, and tools are intended to support the teaching process among pupils, students, and employees of the energy sector in Africa.

# Appendices

## 1. Blake and Mouton Test to Identify Leadership Style

### The Blake and Mouton Managerial Grid Leadership Self-Assessment Questionnaire

Below is a list of statements about leadership behaviour. Read each one carefully, then, using a scale of 0 to 5, indicate how much you agree with each statement. For best results, answer as honestly as possible.

SCORE 0 – Never, 1 – Rarely, 2 – Sometimes, 3 – Often, 4 – Usually, 5 – Always

The statements are designed to assess your leadership style and your strengths and weaknesses as a leader. Once you have completed the scale, you can compare your results to the results of other leaders to see how you scored.

No	Statement	Score
1	I encourage my team to participate when it comes decision-making time and I try to implement their ideas and suggestions.	
2	Nothing is more important than accomplishing a goal or task.	
3	I closely monitor the schedule to ensure a task or project will be completed in time.	
4	I enjoy coaching people on new tasks and procedures.	
5	The more challenging a task is, the more I enjoy it.	
6	I encourage my employees to be creative about their job.	
7	When seeing a complex task through to completion, I ensure that every detail is accounted for.	
8	I find it easy to carry out several complicated tasks at the same time.	
9	I enjoy reading articles, books, and journals about training, leadership, and psychology; and then putting what I have read into action.	
10	When correcting mistakes, I do not worry about jeopardizing relationships.	
11	I manage my time very efficiently.	
12	I enjoy explaining the intricacies and details of a complex task or project to my employees.	
13	Breaking large projects into small manageable tasks is second nature to me.	
14	Nothing is more important than building a great team.	
15	I enjoy analysing problems.	
16	I honour other people's boundaries.	
17	Counselling my employees to improve their performance or behaviour is second nature to me.	
18	I enjoy reading articles, books, and trade journals about my profession; and then implementing the new procedures I have learned.	



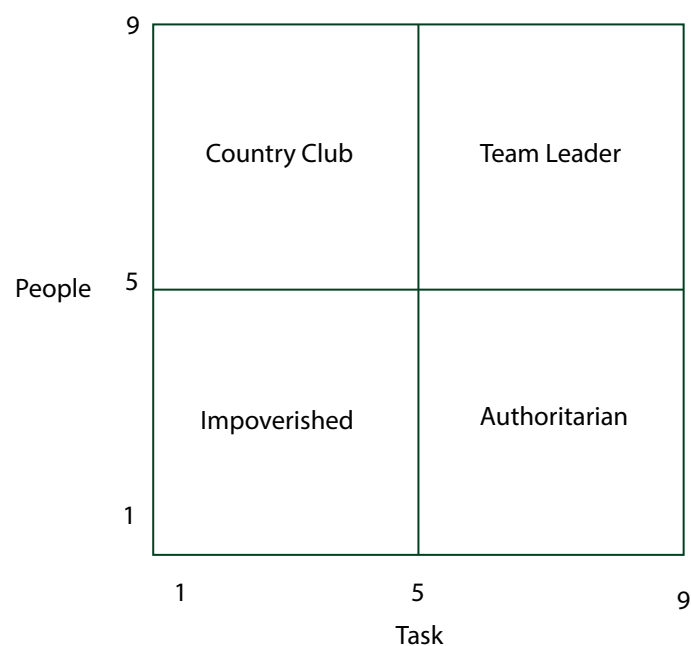
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Now transfer your answers to the table below by entering the result in the appropriate column. Then add up the values in the column and multiply the result by 0.2 to get your final result.

Orientation			
People		Task	
No.	Score	No.	Score
1.		2.	
4.		3.	
6.		5.	
9.		7.	
10.		8.	
12.		11.	
14.		13.	
16.		15.	
17.		18.	
Total (Sum)		Total (Sum)	
Final score (Sum x 0.2)		Final score (Sum x 0.2)	

To plot your final scores on the graph, first find your approximate people score on the vertical axis. Then, draw a horizontal line from that point to the right of the matrix. Next, find your approximate task score on the horizontal axis. Then, draw a vertical line from that point to the top of the matrix.

The two lines will intersect at a point. This point is the leadership dimension that you operate out of.



The grid identifies five distinct leadership styles:

1. Impoverished Management (1,1): This style reflects low concern for both people and production. Leaders adopting this style tend to be passive and avoidant, focusing on maintaining the status quo.
2. Authoritarian Management (9,1): This style displays high concern for production but low concern for people. Leaders following this approach are typically task-oriented and results-driven, often seen as authoritarian or demanding.
3. Country Club Management (1,9): This style emphasizes high concern for people but low concern for production. Leaders with this style are usually people-oriented and supportive, but they may be perceived as lacking direction or focus.
4. Organization Man Management (5,5): This style demonstrates moderate concern for both people and production. Leaders adopting this style are often seen as balanced and pragmatic, though they may be perceived as lacking conviction or drive.
5. Team Management (9,9): This style entails high concern for both people and production. Leaders following this approach are regarded as visionary and inspiring, capable of creating high-performing teams that achieve both productivity and employee satisfaction.

## 2. Hartman Personality Test

Place an "X" next to the answer that best fits you. Choose only one answer from each group. When you finished, count how many times you chose each letter.

Personality advantages and disadvantages

- |                             |                       |                        |                     |
|-----------------------------|-----------------------|------------------------|---------------------|
| 1. a)___opinionated         | b)___nurturing        | c)___inventive         | d)___outgoing       |
| 2. a)___power-oriented      | b)___perfectionist    | c)___indecisive        | d)___self-centered  |
| 3. a)___dominant            | b)___sympathetic      | c)___tolerant          | d)___enthusiastic   |
| 4. a)___self-serving        | b)___suspicious       | c)___unsure            | d)___naive.         |
| 5. a)___decisive            | b)___loyal            | c)___contented         | d)___playful        |
| 6. a)___arrogant            | b)___worry prone      | c)___silently stubborn | d)___flighty        |
| 7. a)___assertive           | b)___reliable         | c)___kind              | d)___sociable       |
| 8. a)___bossy               | b)___self-critical    | c)___reluctant         | d)___a teaser       |
| 9. a)___action-oriented     | b)___analytical       | c)___easy-going        | d)___carefree       |
| 10. a)___critical of others | b)___overly sensitive | c)___shy               | d)___obnoxious      |
| 11. a)___determined         | b)___detail conscious | c)___a good listener   | d)___a party person |
| 12. a)___demanding          | b)___unforgiving      | c)___unmotivated       | d)___vain           |
| 13. a)___responsible        | b)___idealistic       | c)___considerate       | d)___happy          |
| 14. a)___impatient          | b)___moody            | c)___passive           | d)___impulsive      |
| 15. a)___strong-willed      | b)___respectful       | c)___patient           | d)___fun-loving     |
| 16. a)___argumentative      | b)___unrealistic      | c)___directionless     | d)___an interrupter |
| 17. a)___independent        | b)___dependable       | c)___even-tempered     | d)___trusting       |
| 18. a)___aggressive         | b)___often depressed  | c)___ambivalent        | d)___forgetful      |
| 19. a)___powerful           | b)___deliberate       | c)___gentle            | d)___optimistic     |
| 20. a)___insensitive        | b)___judgmental       | c)___boring            | d)___undisciplined  |
| 21. a)___logical            | b)___emotional        | c)___agreeable         | d)___popular        |
| 22. a)___always right       | b)___guilt prone      | c)___unenthusiastic    | d)___uncommitted    |

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23. a)\_\_\_pragmatic      b)\_\_\_well-behaved      c)\_\_\_accepting      d)\_\_\_spontaneous  
24. a)\_\_\_merciless      b)\_\_\_thoughtful      c)\_\_\_uninvolved      d)\_\_\_a show-off  
25. a)\_\_\_task-oriented      b)\_\_\_sincere      c)\_\_\_diplomatic      d)\_\_\_lively  
26. a)\_\_\_tactless      b)\_\_\_hard to please      c)\_\_\_lazy      d)\_\_\_loud  
27. a)\_\_\_direct      b)\_\_\_creative      c)\_\_\_adaptable      d)\_\_\_a performer  
28. a)\_\_\_calculating      b)\_\_\_self-righteous      c)\_\_\_self-deprecating      d)\_\_\_disorganized  
29. a)\_\_\_confident      b)\_\_\_disciplined      c)\_\_\_pleasant      d)\_\_\_charismatic  
30. a)\_\_\_intimidating      b)\_\_\_careful      c)\_\_\_unproductive      d)\_\_\_afraid to face  
facts

Enter the results of part I in the appropriate places:

a) - ..... b) - ..... c) - ..... d) - .....

In the second part of the test, think about how you would react in the following situations. Select only one answer that best suits you. After summarizing, enter your results in the appropriate spaces at the end of the test.

### Situations

31. If I applied for a job, a prospective employer would most likely hire me because I am:
- a) Driven, direct, and delegating.
  - b) Deliberate, accurate, and reliable.
  - c) Patient, adaptable, and tactful.
  - d) Fun-loving, spirited, and casual.
32. When involved in an intimate relationship, if I feel threatened by my partner, I:
- a) Fight back with facts and anger.
  - b) Cry, feel hurt, and plan revenge.
  - c) Become quiet, withdrawn, and often hold anger until I blow up over some minor situation later.
  - d) Distance myself and avoid further conflict.
33. For me, life is most meaningful when it:
- a) Is task-oriented and productive.
  - b) Is filled with people and purpose.
  - c) Is free of pressure and stress.
  - d) Allows me to be playful, light-hearted, and optimistic.
34. As a child, I was:
- a) Stubborn, bright, and/or aggressive.
  - b) Well-behaved, caring, and/or depressed
  - c) Quiet, easygoing, and/or shy.
  - d) Too talkative, happy, and/or playful.
35. As an adult, I am:
- a) Opinionated, determined, and/or bossy.
  - b) Responsible, honest, and/or unforgiving.

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- c) Accepting, contented, and/or unmotivated.
  - d) Charismatic, positive, and/or obnoxious.
36. As a parent, I am:
- a) Demanding, quick-tempered, and/or uncompromising.
  - b) Concerned, sensitive, and/or critical.
  - c) Permissive, easily persuaded, and/or often overwhelmed.
  - d) Playful, casual, and/or irresponsible.
37. In an argument with a friend, I am most likely to be:
- a) Verbally stubborn about facts.
  - b) Concerned about others' feelings and principles.
  - c) Silently stubborn, uncomfortable, and/or confused.
  - d) Loud, uncomfortable, and/or compromising.
38. If my friend was in trouble, I would be:
- a) Protective, resourceful, and recommend solutions.
  - b) Concerned, empathetic, and loyal – regardless of the problem.
  - c) Supportive, patient, and a good listener.
  - d) Nonjudgmental, optimistic, and downplaying the seriousness of the situation.
39. When making decisions, I am:
- a) Assertive, articulate, and logical
  - b) Deliberate, precise, and cautious.
  - c) Indecisive, timid, and reluctant.
  - d) Impulsive, uncommitted, and inconsistent.
40. When I fail, I feel:
- a) Silently self-critical, yet verbally stubborn and defensive.
  - b) Guilty, self-critical, and vulnerable to depression – I dwell on it.
  - c) Unsettled and fearful, but I keep it to myself.
  - d) Embarrassed and nervous – seeking to escape the situation.
41. If someone crosses me:
- a) I am angered, and cunningly plan ways to get even quickly.
  - b) I feel deeply hurt and find it almost impossible to forgive completely. Generally, getting even is not enough.
  - c) I am silently hurt and plan to get even and/or completely avoid the other person.
  - d) I want to avoid confrontation, consider the situation not important enough to bother with, and/or seek other friends.
42. Work is:
- a) A most productive way to spend one's time.
  - b) A healthy activity, which should be done right if it's to be done at all. Work should be done before one plays.

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- c) A positive activity as long as it is something I enjoy and don't feel pressured to accomplish.
- d) A necessary evil, much less inviting than play.

43. In social situations, I am most often:

- a) Feared by others
- b) Admired by others.
- c) Protected by others.
- d) Envied by others.

44. In a relationship, I am most concerned with being:

- a) Approved of and right
- b) Understood, appreciated, and intimate.
- c) Respected, tolerant, and peaceful.
- d) Praised, having fun, and feeling free.

45. To feel alive and positive, I seek:

- a) Adventure, leadership, and lots of action.
- b) Security, creativity, and purpose.
- c) Acceptance and safety.
- d) Excitement, playful productivity, and the company of others.

Enter the results of part I in the appropriate places:

a) - ..... b) - ..... c) - ..... d) - .....

Now ADD your totals from numbers 1-30 to those from numbers 31-45 and get your Grand Totals!

a) - ..... b) - ..... c) - ..... d) - .....

The four personality colour types are assigned to each of the letters:

RED = A	GREEN = B	YELLOW = C	BLUE = D
(Dominant)	(Cautious)	(Supportive)	(Inspiring)

## Interpretation

### ● REDS

Red personalities crave power and autonomy. Put simply, they have a strong desire for control. If they grew up in environments where they could manipulate their family members, they become challenging to handle as they mature. Once they've been accustomed to having things their way, it becomes extremely difficult for them to relinquish control when faced with authority figures in society – teachers, employers, law enforcement, religious figures, or military personnel – who don't grant them the total control they demand.

Reds thrive on productivity. They enjoy being active – whether it's in academic context, their professions, or personal relationships. However, they might not place the same value on things others consider important, such as others' academic achievements, careers, or marriages. Offer them a reason to be productive, and watch them excel. Reds prioritize completing tasks and are

often seen as workaholics. Nevertheless, they resist being coerced into activities that don't pique their interest.

Appearance matters to Reds. They strive to appear knowledgeable and seek validation for their intelligence and insights. They prioritize earning respect over being loved and seek admiration for their logical and practical minds. When dealing with a Red personality, precision and facts are crucial. Emotional displays, like tears, don't sway them.

It's essential not to take Reds too seriously. Despite their confrontational demeanour, they often present their opinions as factual rather than prefacing them with "in my opinion." Many individuals of other personality types become deeply concerned about issues raised by Reds, only to realize later that Reds were merely interested in engaging in a debate.

Reds relish power dynamics. However, if you become emotionally invested in debating issues with them, you might find that they lose interest. Reds actively seek leadership roles. Despite the structured nature of the military, many young Reds choose it as a career to experience leadership opportunities. Referred to as "control freaks," Reds prefer to be in charge. In educational settings, Red children, often faced with Blue personality type teachers, feel frustrated as they're not allowed to take control. If Reds can establish dominance, they will do so, willingly paying any price for a chance to lead.

### ● **BLUES**

Blues find motivation in altruism. Their joy stems from performing kind acts for others. They actively seek opportunities to sacrifice something of their own to bring happiness to another person. Their guiding principle is selflessness rather than selfishness. Many Blues feel discomfort when their actions are solely for their own benefit. They exhibit gestures such as holding doors open, offering rides during car breakdowns, contributing to charitable causes, and sometimes dedicating their entire lives to aiding others.

Intimacy is what Blues yearn for the most. They prioritize both loving and being loved. A genuine Blue might prioritize nurturing a significant relationship over a successful career. This nurturing trait, once considered exclusively feminine, is now more accurately recognized as a characteristic of the Blue personality.

Feeling understood is crucial for Blues. They find gratification in being heard, understood, and valued. Blues are known for openly revealing their vulnerabilities because they cherish being truly known and comprehended. For Blues, the opportunity to emotionally connect is worth the risk of vulnerability. Although Blues might experience heartbreak more frequently, they also invest significantly more time in nurturing loving relationships.

Blues seek acknowledgment and appreciation. A simple gesture like a pat on the back doesn't suffice for them. Blues invest considerable effort into making the world a better place, and occasionally, they need to be reminded of their wonderful qualities. They crave heartfelt thanks and specific recognition for their good deeds. Being remembered on special occasions like birthdays or personalized moments not found on calendars brings them immense joy. Blues thrive on tender loving care.

Their actions are guided by a robust moral conscience. Blues are inherently driven to behave in a proper and fitting manner. They uphold a moral code that influences their decision-making,

value judgments, and even leisure activities. Being morally upright brings them contentment. Among all personality types, Blues possess the strongest sense of integrity. A Blue individual would choose to lose rather than resort to cheating. Blues are renowned for their trustworthiness. Ethically, Blues are the individuals best suited for positions of power, although they seldom occupy such roles.

## ● WHITES

Whites find motivation in seeking peace and harmony. They strive to navigate life without encountering conflict or discomfort. Prioritizing personal well-being often surpasses the importance of adhering to external standards of goodness.

Kindness is crucial for Whites. They respond positively to considerate and friendly gestures but possess an underlying quiet determination that emerges when faced with unkind treatment. They harbour resentment towards admonishment and hold a dislike for harsh words. They readily open up to individuals displaying kindness but recoil from those exhibiting hostility. For Whites, kindness serves as a motivational force, and they struggle to comprehend why others would choose unkindness.

Quiet independence is valued by Whites. Their apparent tranquil demeanour can sometimes be mistaken for stubbornness. Those misinterpreting a White's peaceful nature as an invitation to impose demands and exercise authority soon encounter a wall of passive resistance. Whites possess a resilience that exceeds common perception.

Maintaining a low profile is preferred by Whites. They appreciate being asked for their opinions but seldom volunteer them. They value the respect of others but rarely actively seek it out. Encouragement is needed to prompt discussions about their skills, hobbies, and interests.

## ● YELLOWS

Yellows highly prioritize enjoyment and playfulness in life. They view life as a continuous celebration, always wanting to be the hosts of this party. For instance, a father (of Blue personality) felt disheartened when his son (Yellow personality) chose spending time with friends over him. I suggested to the father that his son was primarily motivated by fun and encouraged him to devise exciting activities to engage his son. Following this "better offer" principle proved successful. Yellows simply seek to have a good time.

Recognition and praise are crucial for Yellows. Few things enhance their relationships more than receiving praise. They seek acknowledgment and validation, even though they may outwardly appear carefree. Yellows seldom disclose their fears and frustrations until they feel emotionally secure, with safety being best conveyed to them through expressions of praise.

Emotional connections are vital for Yellows. Despite their seemingly casual demeanour, they deeply care about things. They crave attention and appreciation, enjoying physical contact as a means of establishing intimate connections comfortably and directly.

Yellows prefer being in the spotlight. Social acceptance holds significant value for them, and friendships rank high in their priorities as they fulfil Yellows' need for general approval. They are articulate and enjoy engaging in lively conversations, but they are also adaptable and can easily flow with the conversation's direction.

Yellows seek action and thrive on adventure. Prone to boredom, they constantly seek new experiences and dislike remaining idle. They surround themselves with friends who, like them, prioritize playfulness over mundane details in life. Ironically, some individuals diagnosed with ADD might simply be Yellows struggling with their inherent restlessness and difficulty maintaining focus.

### 3. A Knowledge Test Will Determine Ecological Awareness and Knowledge about Sustainable Development

#### Test determining the level of ecological awareness and knowledge about sustainable development

**Question 1:** Which of the following is a renewable energy source?

- a) Coal
- b) Water
- c) Natural gas

Correct answer: b)

**Question 2:** What does the abbreviation "CO<sub>2</sub>" mean?

- a) Ozone gas
- b) Ozone
- c) Carbon dioxide

Correct answer: c)

**Question 3:** Which of the following helps reduce plastic in the environment?

- a) Using disposable packaging
- b) Plastic-recycling
- c) Burning plastic in the oven

Correct answer: b)

**Question 4:** What activities contribute to the protection of biodiversity?

- a) Building more prominent and larger cities
- b) Combating poaching and wildlife trade
- c) Cutting down forests

Correct answer: b)

**Question 5:** What is recycling?

- a) The process of producing new materials
- b) The process of reusing raw materials from waste
- c) Waste storage

Correct answer: b)

**Question 6:** Which of the following energy sources is non-renewable?

- a) The wind
- b) The sun
- c) Wood

Correct answer: c) Wood



**Question 7:** What is the greenhouse effect?

- a) The phenomenon of the atmosphere retaining heat
- b) The phenomenon of heat disappearing from the atmosphere
- c) Drought

Correct answer: a)

**Question 8:** Which of the following activities contributes to air protection?

- a) Burning garbage in the open using filters
- b) Using public transport
- c) Burning coal

Correct answer: b)

**Question 9:** What is sustainable development?

- a) Development based only on environmental protection
- b) Development that takes into account the balance between social, economic, and environmental needs
- c) Development conducive to extreme profits

Correct answer: b)

**Question 10:** Which activities contribute to the protection of water resources?

- a) Use water sparingly
- b) Excessive water consumption
- c) Dredging of riverbeds

Correct answer: a)

**Question 11:** What is an example of sustainable economic development?

- a) Investing in conventional energy sources
- b) Creation of new jobs
- c) Reducing salaries as a result of the economic slowdown

Correct answer: b)

**Question 12:** Which of the following is an example of social sustainability?

- a) Reducing health care spending
- b) Protection of human rights
- c) Closing schools

Answer: b) Protection of human rights

**Question 13:** Which of the following phenomena results from climate change?

- a) Increased occurrence of extreme weather phenomena
- b) Falling sea level
- c) Development of fauna and flora in forests

Correct answer: a)

**Question 14:** Is modern agriculture an example of pro-ecological activities?

- a) Yes
- b) No
- c) Yes, if it uses biofertilizers and interferes with the soil structure to a minimum

Correct answer: c)

**Question 15:** Which of the following is an example of responsible consumption?

- a) Buying sustainable products
- b) Restriction on purchases
- c) Recycling and composting
- d) All answers are correct

Correct answer: d)

#### 4. Case Study

##### Mary's Challenge

Mary Roberts is a 32-year-old employee of Dynamic Energy, a company that produces electricity from renewable sources. In the company, she is responsible for the economic analyses of new ventures undertaken. She is a very conscientious and accountable employee, so her direct superiors appreciate her work and allow her to demonstrate the skills in data analysis needed for the project. Her superiors notice her great sense of ecological awareness and understanding of the problem of sustainable development. In her behaviour, she tries to convey her opinions politely, which is why her co-workers like talking to her and respecting her. In addition to being polite, she is effective in her actions, always obtains the necessary information for analysis, and delivers the results of her work on time and is reliable. Employees joke that Mary's only flaw is her lack of assertiveness because she always tries to help her colleagues.

The company management decided to implement an innovative project to create new blades for a wind turbine, which will be more streamlined and have less air resistance, thereby increasing the efficiency of the turbine engine. The project is scheduled for next year because it will be possible to obtain funding from the European Union for research and development work in the renewable energy sector. This is a strategic project that can give Dynamic Energy a competitive advantage. The company decided to entrust the management of the project to Mary, who, according to them, has the predisposition to lead a team of people. They are only afraid that she will be too submissive towards her subordinates, so they decided to finance Mary's educational activities, which will help supplement the missing competencies necessary to run the project effectively.

##### Questions:

1. Should Mary accept or reject the offer to lead the project?
2. Should the company entrust the management of such an essential project to such a young person with no management experience?
3. If a promotion proposal is accepted, what forms and fields of education should she choose to complement her competencies?
4. Create a matrix of Mary's current and desired competencies that she should have when the project starts.

### 5. Competency Matrix of Employees in the Automated Renewable Energy Sector

Company name	Types of competencies								
Organizational unit	Knowledge of renewable energy technology	Programming and data analysis skills	Knowledge in the field of automation of the energy industry	Energy company management skills	Leadership in energy industry teams	Interpersonal competences and cooperation with stakeholders	Project management skills	Environmental awareness	Sustainability knowledge
Worker 1									
Worker 2									
Worker 3									
Worker 4									
Worker 5									
Worker 6									
Worker 7									
Worker 8									
Worker 9									
Worker 10									

- The employee has no competencies
- The employee has low competencies
- The employee has average competencies
- The employee has high competencies
- The employee has very high competencies

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