

# Project Application Form

## Under the Recovery and Resilience Facility

<b>1. Project name</b>
<b>Increasing the Innovation Capacity of the Bulgarian Academy of Sciences (BAS) in the Fields of Green and Digital Technologies</b>
<b>2. Description of the project (objectives, main activities)</b>
<p>As the <b>leading scientific organization</b> in the country, the Bulgarian Academy of Sciences is one of the main pillars of the national research and innovation ecosystem. The Academy employs about 2,700 qualified scientists, covering the main areas of knowledge related to innovation potential. According to data from international databases, the scientists of BAS are the main source of quality scientific output in the country. The share of articles in the fields of Nanosciences, New Materials and Technologies (23.8 %), Energy Resources and Energy Efficiency (10.2 %), Information and Communication Sciences and Technologies (19.2 %) <sup>1</sup> is high, which is a reliable indicator of significant research potential and international recognition of the activity of BAS in these areas, directly related to the two thematic priorities of the project - achieving green transition and digital transformation. Recently published data (Stanford ranking) <sup>2</sup> showed that 49 scientists from the country are among the 2 % most influential scientists in the world, 26 of them from BAS.</p> <p>Apart from being a research organisation, BAS also has a strong orientation towards <b>applied research and innovation</b>. In the last 4 years, an average of about 30 patents have been issued annually and about 20 utility models have been registered with the applicant BAS or its units. For the period 01.01.2018 to 31.12.2019 in the Patent Office of the Republic of Bulgaria, a total of 35 patent applications and 36 applications for registration of utility models were submitted by the units of BAS. <sup>3</sup> For comparison - during the same period, patent applications and those for registration of utility models from all national universities make a total of 18.</p> <p>For the period from 2017 until now the institutes of BAS have been partners of companies in the implementation of 16 projects, funded under the operational programme Innovation and Competitiveness and of 10 projects of the National Innovation Fund. The high expertise and competence of the researchers of BAS, as well as the improved scientific infrastructure, are a solid background for partnership with Bulgarian companies and development/implementation of mutual projects. For the period 2016-2019, over 130 contracts funded by the Bulgarian business have been implemented. <sup>4</sup> Many of these contracts are for R&amp;D in the field of green technologies and new materials, robotics and ICT. The total revenues from them are over BGN 1.5 million for 2019. The institutes of the Academy have also realized research contracts for foreign companies. In 2019, the latter are 6 for over BGN 3.6 million. However, the share of these contracts in the budget of BAS (excluding the state subsidy) is below 5%, which indicates insufficient use of the potential of the Academy in the applied research and innovations, as well as the need for further development of the capacity of BAS for innovation and technology transfer and strengthening of contacts with business.</p>

<sup>1</sup> [www.scopus.com](http://www.scopus.com)

<sup>2</sup> J.P.A. Ioannidis, K.W. Boyack and J. Baas, Updated science-wide author databases of standardized citation indicators, Plos Biol., 18 (2020) e3000918.

<sup>3</sup> <https://portal.bpo.bg/>

<sup>4</sup> Annual reports of the Bulgarian Academy of Sciences.

In recent years, the **reform** of the Bulgarian Academy of Sciences has been aimed primarily at stimulating significant and top scientific achievements by linking salaries with the achieved concrete results. Recently, among the main current problems of the academy are: (i) the relatively weak connection with business and the relatively low number of innovative and technical solutions implemented in practice and (ii) the decreasing number of young professionals choosing scientific careers, especially in disciplines of the field of natural and technical sciences, closely related to opportunities for innovation, incl. those needed for the green transition and digitalisation. To overcome these problems, BAS actively participates in applying existing measures on a national scale, namely:

- Building a research infrastructure in the thematic priorities of ISSS;<sup>5</sup>
- Participation of BAS, together with the research universities, in the construction of the Centres of Excellence (CoE) and Centres of Competence (CoC) under OP SESG.<sup>6</sup> Two of the CoE and four of the CoC are coordinated by institutes of BAS;
- Participation in the National Roadmap for Research Infrastructure (Institutes of BAS are coordinators of 23 of the included 50 infrastructures);
- Participation in the National Research Programmes;
- Participation in programmes for supporting young scientists.

In addition, through a general intra-academic program, steps were taken to stimulate patent activity, as an important prerequisite for the interaction with business.

The current project envisages **continuation of the reform** in BAS in accordance with the National Research Strategy<sup>7</sup> and the Development Strategy of BAS,<sup>8</sup> namely *ensuring the implementation of high quality research and innovation activities in accordance with specific business needs* and the national goals set in the Recovery and Resilience Plan.

The **main goal** of the proposal is to strengthen the **innovation capacity** of BAS and the active participation of the Academy in the national research and innovation ecosystem with a view to accelerating the economic transformation of the country.

To achieve this goal, a reform is needed, including re-training and re-directing a large part of the scientific potential of BAS (research teams of the Academy) to conduct effective applied research, meeting the specific needs of business. The main **thematic focus** will be put on the innovations related to the Green Deal and digitalisation in accordance with the Recovery and Resilience Plan of the Republic of Bulgaria.<sup>9</sup> The priorities are: low-carbon and circular economy (hydrogen energy and mobility, energy storage, low CO<sub>2</sub> emission fuels, CO<sub>2</sub> capture, electromobility, energy autonomous sites, functional materials), other clean technologies, recycling and digital technologies. It is envisaged to strengthen the interdisciplinary approach in applied research and thematic cooperation in the value chain, both between BAS units in different scientific areas, research universities and the international scientific community, as well as mandatory partnership with business to address its needs. For the full realisation of the science-business connection, the project will be implemented at the Institutes/units/centres in BAS, which work on the green and digital technologies and have the resources and capacity to direct their developments to application in business environment. This will provide targeted support for strategic research, innovative and technological solutions and new knowledge, for their transfer to the business or

<sup>5</sup> Innovation Strategy for Smart Specialization of the Republic of Bulgaria 2014 – 2020.

<sup>6</sup> Science and Education for Smart Growth Operational Programme.

<sup>7</sup> National Strategy for Development of the Research in the Republic of Bulgaria 2017 – 2030.

<sup>8</sup> Strategy for Development of the Bulgarian Academy of Sciences 2018 – 2030.

<sup>9</sup> National Recovery and Resilience Plan of the Republic of Bulgaria 2020.

public environment. The process will be provided with a model and tools for continuous institutional connections, based on mutual interest, with organisations from the business environment and the relevant indicators for monitoring their performance.

For the successful realisation of the main goal of the project it is envisaged to achieve some specific objectives (with the respective activities arising from them) and having horizontal or vertical character. The horizontal activities will create the necessary prerequisites for the implementation of the vertical objectives. As they cover the various aspects of innovation processes, the integrated implementation of the identified objectives will lead to significant added value.

The **horizontal specific objectives** are aimed at creating preconditions and environment for accelerated transformation of research outputs into technologies and innovations for the benefit of industry and society.

**Specific objective 1.** Establishing **institutional structures and tools** for effective relationships between BAS and business with a view to accelerated implementation of innovations in the economy and its transformation into a knowledge-based economy.

This objective coincides with the main recommendation of the JRC<sup>10</sup> for intensification of BAS activities in the technology transfer, which emphasizes the crucial role of a **single academic centre** to facilitate the participation of research teams in applied and innovative projects, as well as to update and adapt common policies and good technology transfer practices.

The single academic centre will be built by upgrading the Joint Innovation Centre (JIC) at the Bulgarian Academy of Sciences and including existing small offices for technology transfer. The main task of the Centre will be to channel and coordinate the efforts of the research teams of the Academy as a whole in their relations with business operators. In this respect, the following aspects are key: (i) identifying and continuously updating business needs (ii) identifying the most appropriate teams for specific tasks by applying an interdisciplinary approach when setting up temporary thematic research teams and (iii) accelerating the signing of agreements/contracts with business. In order to achieve high efficiency, at each of the institutes engaged in innovation, one or two persons from the scientific staff will be appointed for communication with JIC. In parallel, broad advertising campaigns will be undertaken, aimed at acquainting the business with the innovative opportunities of the scientific teams of BAS and the opportunities for using the scientific infrastructure with a view to wider participation of the business in the innovation processes. The effective work of the Centre will facilitate the access of the industry to the research teams.

Pilot testing of the JIC efficiency will be carried out in the field of **green and digital technologies**. The choice of this thematic focus is determined both by the need for innovative solutions related to the Green Deal and digital technologies, and by the fact that leading organisations in the new Centres of Excellence and Centres of Competence in the field of green technologies and digitalisation are institutes of BAS. This will allow consolidating the scientific potential not only of BAS, but also of research universities in the performance of a given task, which will strengthen the interdisciplinary approach for its solving. In this sense, JIC will play a key role in achieving the vertical specific objectives and overall project management.

While the currently implemented applied research and innovation developments are known, for their expansion it will be necessary to more accurately identify the innovation potential of BAS.

---

<sup>10</sup> JRC Strategic evaluation of the Bulgarian Centres of Competence and Centres of Excellence and recommendations for their further development

Mapping the potential innovation teams at BAS in the field of green and digital technologies will be one of the first tasks related to this project.

The main activities to achieve this objective (described in detail below) include (i) upgrading the single innovation centre and relocating it to a renovated and adapted building with opportunities for business meetings and exhibitions, (ii) expanding the staff and increasing its the qualification (iii) building a web portal for communication with business, (iv) updating internal normative documents related to intellectual property, (v) incubating startup and spin-off companies and involving regional research centres in the innovation process, and (vi) overall project management.

**Specific objective 2.** Development of the research potential of BAS by increasing the **skills and qualification** in the field of innovations and establishing an interdisciplinary, intersectoral and international approach.

A critical factor for the success of the innovation process in the country is the availability of qualified scientific staff with **skills** in the field of applied research and innovation. That is why the development of the research potential of BAS in this field is extremely important. In-service training measures will target different groups.

In order to achieve sustainable success, it is necessary to start building innovative skills of scientists at the beginning of their scientific careers. In this regard, the introduction of new doctoral courses with entrepreneurial orientation in the Training Centre of BAS is envisaged. These courses will be aimed at PhD students whose research topics are in the field of natural sciences, mathematics, engineering and ICT, i.e. directly related to the development and implementation of green and digital technologies leading to economic transformation of the country. In addition to regular lecturers, the courses will be held by prominent innovators from the country and abroad, as well as business representatives. These courses will be also open to young scientists from BAS. Coordination of the activities for raising the qualification will be carried out by the Training Centre at BAS, and for this purpose it is planned to appoint an expert administrator.

In parallel, **training courses** for researchers will be organised to increase their knowledge in various aspects related to innovation (e.g. intellectual property, patent law, etc.). These courses will focus on green and digital technologies, which are the thematic priority of the project.

To respond to specific business needs in a timely manner, the creation of **thematic coalitions** will be launched, using a multidisciplinary approach to solving problems.

In order to redirect a significant part of the scientific staff of BAS to conducting applied research and innovations in response to specific current needs of the business, it is necessary to create a working system of **incentives**. One of the measures in this direction is to increase the relative weight of innovation in the assessment criteria of scientists. Another important measure is the provision of material stimuli during the innovation process, which is to be considered in the development of the BAS rules for innovations.

An important element of the reform efforts is the implementation of the **cross-sectoral approach**. It includes the use of a variety of measures and activities related to cross-sectoral mobility and exchange. "Cross-sectoral mobility", in the broadest context, refers to all possible bridges that can be built between academia and industry or other employment sectors. The application of this approach aims to increase the understanding of both academic and business circles of the need for cooperation, to stimulate greater flexibility and trust in relations between sectors, to acquire new skills and experience by both PhD students and researchers as well as by employees in enterprises.

The main activities related to the implementation of this objective include improving the

qualification and skills of PhD students, young scientists, as well as retraining of scientists to work on applied research.

**Specific objective 3.** Strengthening the innovation capacity of BAS by modernizing the infrastructure related to the transfer of green and digital technologies.

Applied research will rely primarily on the **existing** scientific infrastructure. In case of need for access to unique facilities outside the system of BAS, cooperation with the Research Universities and / or Sofia Techpark as well as with the infrastructures included in the National Road Map will be sought. The modernisation of the infrastructure will be carried out mainly towards improving the **working conditions** in the institutes of BAS, which have the potential for development of innovative activity in the thematic areas of the project and bringing them into European norms.

As the project aims to create effective temporary work teams, including scientists from all over the country (both from BAS institutes and universities), effective **communication** between the participants in the applied research and their information security are essential for success. Communications should be carried out in conditions of enhanced cybersecurity, since in most cases they will relate to confidential business tasks and developments with intellectual property. In this regard, it is envisaged to provide high-quality Internet connectivity with increased security and to improve the cybersecurity for research institutes that have the potential for innovative activities in the field of green and digital technologies.

The overall improvement of the research infrastructure and the accumulation of knowledge in the priority areas will increase the cooperation between the academic and private sectors and will accelerate the process of transforming scientific outputs and knowledge into innovations. This will definitely increase the innovation level of the Bulgarian enterprises and will contribute to the desired economic transition.

The main activities for the implementation of this objective are: rehabilitation of the infrastructure by improving the working conditions and communication.

**The vertical specific objectives** are aimed at fulfilling the thematic focus of the project, namely the transfer of technologies and innovations in the field of green transition and digitalisation as an important step in the overall development of the innovation capacity of BAS.

**Specific objective 4.** Creation of **innovative products** and solutions by scientific teams of BAS in response to specific requests from businesses related to the green and digital transition.

A prerequisite for the implementation of this objective will be the creation, with the help of the Scientific & Innovation Councils, of intra-academic and national research and innovation **networks** in the various thematic areas related to the implementation of the green technologies and digitalization, which will lead to consolidation of the scientific community in the respective fields and uniting the efforts for solving specific problems. The tasks will be performed by **interdisciplinary** teams from different units of BAS, in some cases together with research universities or other organizations, with the effective use of specialized infrastructure and close interaction with business representatives.

To initiate a good start of the programme and to convince more business representatives of the benefits of implementing innovations in order to increase the efficiency of the economy, the programme is expected to start with partial co-financing of the R&D carried out at the **request of the business**. The degree of co-funding will depend on the technological level of the final products. On the other hand, the requirement for co-funding by the business will engage the contracting parties to offer up-to-date issues. In order to eliminate the possibility of developing inadequate requests, all proposals will be discussed in accordance with a procedure established by

JIC with the help of the Scientific & Innovation Councils.

It is also envisaged to acquire consumables and small equipment aimed at **performing innovative activities** in the field of green technologies (additional equipment for specific research related to scaling, tests in simulated operating conditions, sensors, etc.). As the response to actual specific business needs is a specific feature of the current project, at this stage it is not possible to accurately forecast the necessary consumables and equipment. They will be determined for each task on the basis of a project proposal considered by the relevant Scientific & Innovation Council, and care will be taken to avoid duplication with available equipment.

The main activities for the implementation of this objective are: creation of thematic teams and Scientific & Innovation Councils, development and implementation of a mechanism for solving specific tasks at the request of the business.

**Specific objective 5.** Establishing sustainable long-term **relationships with businesses** in the field of green and digital technologies through joint **PhD training**.

Joint **doctoral** studies with supervisors from the Bulgarian Academy of Sciences and business are extremely favourable for establishing long-term science-industry relations. The topics of the doctoral theses will be in the field of green and digital technologies. On the one hand, this will lead to an increase in the innovation capacity of the enterprise in which the PhD student will continue his/her career by hiring personnel qualified in the field of science and innovation. On the other hand, the staff, familiar with the details of the scientific system, is expected to promote the participation of business in innovation processes together with research teams from BAS. The processes of elaboration of the theses will be directly related to innovative solutions, a large part of which will be implemented in practice, which will contribute to the transition of the economy to a knowledge-based economy. In this sense, specific objectives 4 and 5 are closely interlinked.

The main activity for this purpose will be to attract and train PhD students from business enterprises.

**Specific objective 6.** Strengthening the country's participation in **R&D calls** announced by European and other institutions.

Increasing the participation of Bulgarian teams in EU initiatives is crucial for the success of the innovation processes in the country. There is currently a lack of adequate institutional support for the preparation of **competitive project proposals** by national teams, as well as for participation in international teams. This objective aims at the introduction of a scheme to support the development of project proposals that are scientifically, innovatively, linguistically and economically refined. Proposals from nationally based teams with the participation of scientists from the Bulgarian Academy of Sciences and business representatives, as well as participation in large multinational projects will be supported.

As a result, the share of BAS project proposals and their success in the EU Framework Program and calls of other international funding organizations is expected to increase.

The main activities will be related to support for the preparation of project proposals.

**Specific objective 7.** Protection of the **intellectual property** of BAS in the field of green and digital technologies in order to facilitate the commercialisation of scientific results.

Although BAS ranks first among research and educational institutions in the country in the number of protected **patents**, this number is far below the level expected by one of the main organizations involved in the country's innovation process. Among the reasons for this is the low motivation of scientists to protect intellectual property and the financial difficulties that accompany these

processes.

In order to increase the number of filed applications for patents and utility models in the thematic areas of the project, consideration and evaluation by the Scientific Innovation Councils of BAS with the participation of experts from the JIC is envisaged. The appropriateness of filing and maintaining European patents will be assessed. Financial support will be provided for the preparation and filing of patents and utility models based on the recommendations of the Councils.

The main activities in connection with the implementation of this objective will be related to evaluation and support of patent applications and utility models, as well as maintenance of patents in compliance with the Regulations on Intellectual Property of BAS and relevant units and organizations involved in the creation of intellectual property.

**Specific objective 8.** Deepening the **internationalization** of the R&D system of BAS in the field of green technologies.

Achieving high scientific results with potential for practical application cannot be realised in an isolated environment, but only in the conditions of effective international cooperation.

To adapt the world experience and best practices, scientists from BAS will carry out **specialisations** in international centres with proven innovative achievements. In order to maintain high qualification, the participation in international scientific forums will be supported, thematically overlapping with specific applied research activities of the project. International scientific forums in thematic sub-areas of the project (green and digital technologies) will also be organised.

In addition, for a certain period of time, **foreign specialists** in the field of green technologies will be temporarily attracted at the Bulgarian Academy of Sciences. Special attention will be paid to the Bulgarian scientific diaspora abroad. These specialists will not only contribute to the transfer of the leading world know-how, but will be also closely connected with the improvement of the qualification of both the young scientists and PhD students, as well as the scientific staff of BAS, engaged in innovative activities.

The internationalisation of scientific and applied research will be carried out through a series of activities, including exchange of scientists, organisation and participation in scientific forums and information security.

## **DESCRIPTION OF THE ACTIVITIES BY PERIODS**

The described activities are related to the specific objectives, where they are justified, and are numbered accordingly.

### **Activity 1.1.** Project management.

Effective project management is crucial to the overall success. For this purpose, a Project **Coordinator** will be appointed, who together with the management team will rely on and interact closely with the management bodies of BAS. JIC will also play a key role in management (see Activity 1.2), as well as the established accompanying structures, such as Scientific & Innovation Councils (see Activity 1.3). The main tasks of the management will be:

Task 1.1.1. Overall project coordination, logistics, control over deadlines observance and achieving of indicators.

Task 1.1.2. Communication with the funding body and state institutions.

Task 1.1.3. Control over the spending of funds.



Task 1.1.4. Organisation, preparation and implementation of the planned public procurement acts.

Task 1.1.5. Announcement of joint PhD positions with business (together with the Training Centre of BAS).

**The management team** will include a manager (coordinator), an administrator and an accountant. The necessary experts, such as public procurement specialists / consultants, lawyers, construction and installation specialists, etc. will be attracted as consultants.

*Responsible:* President of BAS, Management Team

**Activity 1.2.** Upgrading the **expert potential** of the Joint Innovation Centre (JIC) at the Bulgarian Academy of Sciences for effective coordination of innovation activities and building sustainable business relations.

Currently, JIC is one of the smallest units of BAS (8 employees) and does not have the capacity to take on the organization of large-scale innovation activities. Therefore, it is necessary to upgrade the expert potential.

Task 1.2.1. Appointment of: (i) an intellectual property rights protection expert, (ii) commercialisation and technology transfer experts with a focus on green and digital technologies, (iii) a business relations coordinator and (iv) a research and relations centre coordinator for excellence and competence.

Task 1.2.2. Improving the **qualification** of JIC staff by exchanging experience with European institutions and centres with proven good practices in the field of intellectual property protection, innovation, transfer and commercialisation of scientific products.

The opening of the new positions is an integral part of the BAS reform, aimed at significantly improving the relations and interaction with business. The increased innovation activities of BAS as a result of the project implementation will lead to increased own revenues, which in turn will lead to the possibility of keeping the newly appointed specialists after the end of the intervention and will lead to a long-term and sustainable effect.

*Responsible:* JIC

**Activity 1.3. Identification** of the innovation potential of BAS in the field of green and digital technologies.

The implementation of this activity is a priority. The **innovation potential** will be identified on the basis of accumulated experience and competence, achieved results, area of expertise, declared desire and available infrastructure. The collected information will be incorporated into a database which will be continuously updated. The access to this database will allow the rapid formation of research teams in response to announced specific business needs.

For the implementation of this activity three Scientific & Innovation Councils will be formed on the basis of prominent scientists in the thematic areas and with the participation of business representatives:

- Council on Innovative Materials and Green Technologies,
- Council on Resource Efficiency and Circular Economy,
- Council on Information and Communication Technologies.

The Research & Innovation Councils will have various functions in the implementation of the project, aimed at consolidating and increasing the efficiency of the expert potential for high-quality R&D, evaluation and mediation of relations with enterprises and other stakeholders.



*Responsible:* Scientific & Innovation Councils

**Activity 1.4.** Building an electronic platform / portal for communication with business and other interested users / countries.

The activity covers the design and maintenance of an **electronic platform** (in Bulgarian and English) including four components: (i) a virtual demonstration centre with products and technologies of the Academy; (ii) a register with information on the intellectual property of BAS, with the possibility for thematic search of new and maintained objects of intellectual property of BAS; (iii) information on ongoing competitions for research funding and access to finance, licensing agreements, industrial cooperation agreements, etc. and (iv) contact page / form and expression of interest / proposal for joint development / solving of a technological task and / or expert consultation.

This activity includes the following tasks / measures:

Task 1.4.1. Design and development of a modern interactive platform / portal for communication with business and other stakeholders.

Task 1.4.2. Appointment of an IT expert to maintain and update the information on the platform as well as the IT communication channels of the JIC.

*Responsible:* JIC

**Activity 1.5.** Adaptation of an existing building into a modern demonstration centre for business communications.

This activity includes reconstruction and **adaptation** (construction and installation works and furnishing) of an existing building in the Campus on BAS situated on the 4<sup>th</sup> kilometre (Sofia) in a modern centre for communication with business and where JIC will be located. The building will provide opportunities for joint activities with business: workshops in various formats, organization of temporary thematic exhibitions (both by the business and the scientific community), joint seminars and information days. Experts with defined areas of responsibility will be appointed in JIC, whose qualification will be increased through participation in specialised trainings, seminars and schools, through international exchange of employees for industrial relations and transfer of technologies and specialisations in similar centres with good practice.

It is envisaged that the building will be in close proximity to the building of the CoE for mechatronics and clean technologies, which will facilitate both the interaction of JIC with the Centre and the acquaintance of business representatives with the modern infrastructure of BAS.

*Responsible:* BAS, JIC

**Activity 1.6.** Increasing the efficiency of intellectual property management of BAS and its units.

Task 1.6.1. Updating of the **Regulations for intellectual property** of BAS and, if necessary, other normative documents, regulating the implementation of the activity.

Task 1.6.2. Building an **incubator** for startup and spin-off companies (including providing mentoring in the field of entrepreneurship).

It is planned to build / create an incubator "without walls" (virtual incubator) for startup and spin-off companies. A modern incubator model will be used in the conditions of modern economies working in a network. The incubation of companies will be carried out in an electronic environment, and a portfolio of services will be provided, including: mentoring, coaching, management of innovation processes and assistance for protection and management of intellectual property.

*Responsible:* JIC, General Assembly of BAS

**Activity 1.7.** Reorganization of the **Regional** Academic Centres with a view to their full involvement in the innovation process.

The regional academic centres of BAS are units with huge potential for stimulating the science-business relations in the separate **regions of the country**. Close cooperation of these units with JIC will be ensured in order to promote the relations of BAS with business structures from all over the country.

*Responsible:* BAS, JIC

**Activity 2.1.** Improving the knowledge and **qualification** of PhD students and researchers focused on entrepreneurial skills, protection of intellectual property rights and preparation of project proposals.

Task 2.1.1. Development and introduction of doctoral courses at the BAS Training Centre with entrepreneurial orientation, protection and management of intellectual property, and preparation of project proposals in the fields of green and digital technologies.

Task 2.1.2. Development and organization of qualification courses for researchers by teams conducting research in priority areas of the project.

Task 2.1.3. Attracting lecturers / course leaders from the country and abroad.

Task 2.1.4. Realization of specialisations and exchange of experience in international centres / networks, manifested with innovative achievements, as well as in innovative companies.

The coordination and administration of the implementation of the tasks under activity 2.1 will be carried out by an expert at the Training Centre – BAS.

*Responsible:* Training Centre of BAS

**Activity 3.1.** Partial rehabilitation of the **infrastructure** in the units, which will be related to applied research and innovation in the field of green and digital technologies.

It is envisaged that this activity will focus on improving **working conditions** in the institutes of BAS and bringing them in line with European standards which have the potential for development of innovative activity. This includes improving the microclimate and work environment for research and innovation (laboratories and offices, storage facilities for chemicals and other consumables requiring special conditions), improving the efficiency and security of the **internet connections** by building appropriate communication infrastructure. To improve security, it is planned to install a DDoS protection platform.

*Responsible:* BAS and the respective units of BAS, Management team

**Activity 4.1.** Establishment of **thematic teams** and networks for R&D in the field of green and digital technologies.

The thematic teams will be formed with the help of the Scientific & Innovation Councils on the basis of the identification of the innovation potential of BAS, together with the JIC experts.

*Responsible:* JIC, Scientific & Innovation Councils, Management team.

**Activity 4.2.** Carrying out **R&D** in the fields of green and digital technologies to create innovative products for specific business needs.

As an initial stage, the applied research and innovative activity will be carried out in response to

the declared **specific needs of the business**. The quality implementation of this activity will lead to an increase in business confidence in R&D carried out by the teams of BAS, which is a prerequisite for successful advertising of their own developments, consistent with the leading world experience.

As convincing more and more business representatives in favour of R&D is crucial not only for the success of the current project but also for the overall development of the innovation process in the country, **co-funding** of activities related to specific business needs is envisaged. Co-funding will depend on the degree of the product technological level, and will decrease with the increase of this degree. The co-funding will be used for remuneration of the temporary research teams, for consumables and for small devices, necessary for the implementation of the specific project and not duplicating the existing infrastructure.

Separate actions will be taken to ensure **cybersecurity** and information protection.

*Responsible:* Management team, JIC, Mixed research teams from BAS, business representatives and (optionally) the Research Universities.

**Activity 4.3.** Cross-sectoral exchange of specialists / researchers to solve specific technological / product problems or to acquire specific skills.

This activity is expressed in the implementation of short-term intersectoral exchange, i.e. visits, short-term specializations of both researchers in enterprises and *vice versa* - engineering or R&D staff from the business in the units of BAS, including shared workspaces. The purpose of the exchange is to get acquainted with and study a specific technological / product problem, to plan or carry out joint R&D on site to solve it, to exchange information and to acquire specific skills.

*Responsible:* Management team, Scientific & Innovation Councils

**Activity 5.1.** Supervising of joint **PhD theses** with business and building specialists in accordance with the needs of business in the field of green and digital technologies.

In order to successfully attract **PhD students from the business** community, it is necessary, in addition to providing current topics and conditions for successful completion of the doctoral program, to attract students by adequate scholarships. Therefore, the scholarships of full-time PhD students are expected to exceed the average scholarships for the country. In addition, funds are planned for the maintenance of the PhD students.

During the theses preparation, the PhD students will perform **R&D** on application-oriented topics related to business.

*Responsible:* Management team, Training Centre of BAS, scientists from BAS and business representatives.

**Activity 6.1.** Supporting the participation of teams from BAS in national and international consortia for preparation of project proposals in calls under the framework program Horizon Europe and other relevant programs.

One of the main reasons for the relatively low success of Bulgarian project applications in the field of R&D to European and other funding international institutions is that they are not precised in all respects. Personal contact in the formation of international consortia is also essential. The activity offers support for the participation of national teams in **various programs** through a series of measures:

Task 6.1.1. Supporting business trips of Bulgarian scientists aimed at forming an international scientific **consortium**.

Task 6.1.2. Assistance in preparing the **current** and **final versions** of the project proposals and specifying the financial parameters of projects submitted by national teams.

*Responsible:* Management team, International Department of BAS.

**Activity 7.1.** Consideration and evaluation of the obtained scientific results and developed technologies / products for taking steps to protect intellectual property.

The evaluation will be organized by the Scientific & Innovation Councils, which will appoint qualified reviewers. It will contain information on the level of technological readiness and market potential.

*Responsible:* Scientific & Innovation Councils, JIC

**Activity 7.2.** Patent applications or utility model registration.

Based on the Scientific & Innovation Councils' opinion, the protection of intellectual property will be financially supported.

*Responsible:* Management team, Scientific & Innovation Councils.

**Activity 8.1.** Strengthening the expert potential of BAS in the field of green and digital technologies by attracting researchers with experience in the preparation of project proposals under European and other relevant programs.

The activity envisages temporary attracting, in the institutes of BAS, of **foreign scientists** with experience in the innovation process and preparation of project proposals. These researchers are expected to transfer their skills to BAS research teams and thus to enhance their ability to prepare competitive project proposals.

*Responsible:* Management team, Scientific & Innovation Councils, BAS International Department.

**Activity 8.2.** Improving the **qualification** of leading scientists from BAS in the field of green and digital technologies.

Task 8.2.1. Advanced training through short-term specializations in research centres abroad with leading experience in the innovation process.

Task 8.2.2. Further training through participation in thematic conferences focused on applied research.

Task 8.2.3. Providing necessary scientific literature for the working groups for which the country does not have a subscription, or other necessary documents or data.

*Responsible:* Management team, Scientific & Innovation Councils, BAS International Department.

**Activity 8.3.** Organizing thematic international **scientific forums**.

It is envisaged that each of the three Scientific & Innovation Councils will organize a scientific forum in the country. Each scientific forum will be in the thematic area of the Council and will be focused on applied research and innovation. The forums will be characterized by enhanced participation of business representatives.

On the one hand, these forums will contribute to acquainting Bulgarian innovators with the latest (unpublished) developments of leading scientists in the world, and on the other hand will contribute to raising the prestige of our scientists among business representatives.

*Responsible:* Management team, Scientific & Innovation Councils, Organizing Committees.

### 3. Beneficiary

The Bulgarian Academy of Sciences and its units.

### 4. Time schedule for project Implementation, including activities, stages<sup>11</sup>

The total period for implementation of the program is 2021-2026. This period is divided into two stages:

Stage I - 2021 - 2023

Stage II - 2024 - 2026

The table below summarizes the planned activities in the two sub-stages and for the six-month periods. *Six-months period 1* covers the period up to the end of 2021.

Activity	Stage I					Stage II					
	Six-months period										
	1	2	3	4	5	6	7	8	9	10	11
1.1											
1.2											
1.3											
1.4											
1.5											
1.6											
1.7											
2.1											
3.1											
4.1											
4.2											
4.3											
5.1											
6.1											
7.1											
7.2											
8.1											
8.2											
8.3											

	Implementation of the activity
	Maintenance of the activity

#### 4.1. When can the project implementation start at the earliest after its approval?

Immediately after the conclusion of the contract

<sup>11</sup> The time schedule shall be relevant for determining interim targets within the framework of the Recovery and Resilience Plan and is directly related to the disbursement of grant instalments from the Recovery and Resilience Fund.

**5. Indicative financial resource by activity, including sources of financing (national budget, European funding, private funding, IFIs)**

**47 440 970 BGN**

Source of funding - European funding

<i>Acti- vity</i>	<i>Infrastruc- ture</i>	<i>Physical capital</i>	<i>Human capital</i>	<i>Labour</i>	<i>Consum- ables</i>	<i>Technol- ogy</i>	<i>Total in BGN</i>
1.1	0	10 000	0	1 704 760	50 000	0	<b>1 764 760</b>
1.2	0	20 000	90 000	1 062 400	50 000	0	<b>1 222 400</b>
1.3	0	0	0	81 450	0	0	<b>81 450</b>
1.4	0	0	0	141 240	0	0	<b>141 240</b>
1.5	3 500 000	0	0	0	0	0	<b>3 500 000</b>
1.6	0	0	0	20 000	0	0	<b>20 000</b>
1.7	0	0	20 000	0	0	0	<b>20 000</b>
2.1	0	0	168 480	588 340	0	0	<b>756 820</b>
3.1	11 000 000	0	0	0	0	3 500 000	<b>14 500 000</b>
4.1	0	0	10 000	0	0	0	<b>10 000</b>
4.2	0	2 000 000	0	13 645 200	2 000 000	100 000	<b>17 745 200</b>
4.3	0	0	29 100	0	0	0	<b>29 100</b>
5.1	0	0	2 700 000	0	0	0	<b>2 700 000</b>
6.1	0	0	900 000	1 800 000	0	0	<b>2 700 000</b>
7.1	0	0	0	70 000	0	0	<b>70 000</b>
7.2	0	0	0	0	0	750 000	<b>750 000</b>
8.1	0	0	0	700 000	0	0	<b>700 000</b>
8.2	0	0	500 000	0	0	50 000	<b>550 000</b>
8.3	0	0	180 000	0	0	0	<b>180 000</b>
<b>Общо</b>	<b>14 500 000</b>	<b>2 030 000</b>	<b>4 597 580</b>	<b>19 813 390</b>	<b>2 100 000</b>	<b>4 400 000</b>	<b>47 440 970</b>

**COST JUSTIFICATION:**

- **Construction / rehabilitation of infrastructure (construction and installation work) - BGN 14 500 000.**

- Partial rehabilitation of the infrastructure including activities (construction and installation works for internal renovation of laboratories and offices) to improve working conditions and bring them into European standards in units of BAS, which will perform R&D activities (BGN 5 000 000) and construction of quality internet connectivity (BGN 6 000 000) - a total of BGN 11 000 000.

- Reconstruction of an existing building to build a modern business communication centre - costs include all activities related to the reconstruction such as preparation of a technical project, its approval, obtaining a building permit, construction and installation activities and obtaining the necessary acts and protocols related to its state and local fees, furniture - BGN 3 500 000.

- **Physical capital (purchase of machinery and equipment) - BGN 2 030 000.**

- Equipment for carrying out innovative activities (only supplementary equipment for specific studies related to scaling, tests in simulated operating conditions, etc.) in the performance of Activity 4.2. - BGN 2 000 000.

- Office equipment for implementation of Activity 1.1. Project management - BGN 10 000.

- Office equipment for performance of activity 1.2. - BGN 20 000.

- **Human capital (skills development, retraining) BGN 4 597 580.**

- Joint doctoral studies with business (costs for 30 doctoral studies - scholarships and maintenance) a total of BGN 2 700 000.

- Expenses for business trips, specialisations, exchange of experience - BGN 1 300 000.

- Attracting lecturers from abroad for the Training Centre (overnight stays, travel and business trips for 32 business trips of 6 days each) for Activity 2.1 - BGN 68 480

- Realisation of specialisations and exchange of experience in international centres / networks, manifested with innovative achievements, as well as in innovative companies (overnight stays, travel and business trips for 10 visits) - BGN 100 000.

- Expenses related to short-term intersectoral exchange (visits, short-term specialisations up to 14 days of researchers in enterprises) - BGN 29 100.

- Expenses for building international consortia for participation in competitions under the EU Framework Program and other European and international initiatives - BGN 900 000.

- Expenses for implementation of short-term specialisations in leading research centres abroad, leading in the field of green and digital technologies (Activity 8.2.1) - BGN 350 000

- Expenses for workshops, information days, exhibitions, etc. in performance of Activity 8.2.2 - BGN 150 000.

Expenses for organising thematic international forums - BGN 180 000.

- Improving the qualification of the experts from JIC (Activity 1.2) (14 participations in exchange of experience and/or training seminars, including overnight stays, travel, per diems and participation fee for the seminars) - BGN 90 000.

- Expenses for researchers/experts from the Regional Academic Centres for raising their qualification, participation in seminars and workshops - BGN 20 000.

- **Labour (wages, consulting services) - BGN 20 563 390.**

- Labour costs are calculated in accordance with the Standard Table for the maximum allowable amounts of hourly wages of people employed in connection with the implementation of projects under Priority Axis 1 of The Executive Agency Operational Programme Science and Education for Smart Growth, applicable for the period after 01.11.2018.

- Management expenses (manager, administrator, lawyer, accountant, experts) - BGN 1 304 760.

- Consultants (preparation of technical specifications for procedures under the Public Procurement



Act, participation in commissions, etc.) - BGN 400 000.

- Labour costs for the teams performing R&D in the field of green and digital technologies (remuneration for experienced researchers (habilitated), researchers with a doctor's degree, researchers without a doctor's degree; engineering staff) - BGN 13 645 200.

- Remuneration for experts of a general academic unit for innovation and technology transfer (experts in intellectual property, commercialisation and technology transfer, coordinators of relations with business/research teams and CoE and CoC) - BGN 1 062 400.

- Remuneration of the members of the Scientific-Innovation Councils. It is envisaged that they will consist of 5 members, highly qualified and experienced scientists/experts, who will be paid to attend a meeting. The councils will have 10 meetings per year, with an average duration of 2 hours per meeting (BGN 74 250). It is envisaged that the meetings will be held mainly remotely. A face-to-face meeting is scheduled once a year to summarise and report on the activities of the councils, as well as to discuss/make strategically important decisions. Therefore, business trips for participation in meetings of the Scientific-Innovation Councils of members of the councils who do not live/work in Sofia (BGN 7 200) are envisaged for this item - a total amount of BGN 81 450.

- Labour costs of an IT expert (BGN 106 240) and construction of an electronic platform (BGN 35 000) for communication with business in the performance of Activity 1.4. BGN- 141 240.

- Labour costs of experts for the performance of Activity 1.6 - BGN 20 000.

- Labour costs for the implementation of Activity 2.1 (salaries of the administrator of the Training Centre - BGN 205 840; salaries of lecturers - development and introduction of doctoral courses - BGN 270 000 and qualification courses - BGN 112 500) total - BGN 588 340.

- Labour costs for the preparation of European projects in performance of Activity 6.1. - BGN 1 800 000.

- Labour costs for evaluation from reviewers/experts of scientific results and developed technologies/ products to protect intellectual property in the implementation of Activity 7.1. - BGN 70 000.

- Remuneration costs of attracted leading researchers in the field of green and digital technologies, as well as with experience in the preparation of project proposals under European and other relevant programs (Activity 8.1) - BGN 700 000.

- **Consumables - BGN 2 100 000.**

- Consumables and materials for R&D - BGN 2 000 000.

- Office consumables for the performance of Activity 1.1. Project management - BGN 50 000

- Office consumables for the performance of Activity 1.2. - BGN 50 000

- **Technology (acquisition of intangible fixed assets - patents, software...) - BGN 3 650 000.**

- Security software (DDoS protection) - BGN 3 500 000.

- Support for patent applications and utility models (fees) in the country and abroad - BGN 750 000.

- Expenses for software regarding Activity 4.2. - BGN 100 000.

- Expenses for supply/access to specialised literature (Activity 8.2.3.) - BGN 50 000.

## 5.1. Indicative allocation of the financial resource, depending on the type of expense

<i>Type of expense</i>	<i>Necessary funds, BGN</i>	<i>Percentage of indicative budget</i>
Infrastructure construction / rehabilitation(Construction and installation work)	14 500 000	31 %
Physical capital (purchase of machinery and equipment)	2 030 000	4 %
Human capital (skills development, retraining)	4 597 580	10 %
Labour (wages, consulting services)	19 813 390	42 %
Consumables	2 100 000	4 %
Technology (acquisition of intangible fixed assets - patents, software...)	4 400 000	9 %
Total	47 440 970	100 %

## 6. Indicators

### 6.1. Result indicator/s

<i>Result indicator</i>	<i>Starting value for 2020</i>	<i>Intermediate value,<sup>12</sup> 2023</i>	<i>Final value, 2026</i>
Number of patents and utility models of BAS -			
- patent applications in the country	12 <sup>13</sup>	50	120
- European patent applications	1	6	20
- Registered utility models	18	60	150
Number of public-private scientific articles with the participation of BAS as a result of the intervention	0	15	70
Number of joint projects with business partners as a result of the intervention	0	10	30
Joint PhD students with business partners			
- current	0	30	5
- defended	0	0	25
Adapted building for business contacts (JIC)			
- under construction	0	1	0
- completed	0	0	1

<sup>12</sup> The intermediate and the final values are cumulative for the period.

<sup>13</sup> Data for 2019.

<b>6.2. Effect indicator/s</b>			
<i>Effect indicator</i>	<i>Starting value for 2020</i>	<i>Intermediate value, 2023</i>	<i>Final value, 2026</i>
Implemented innovative green and digital technologies / solutions as a result of the intervention	0	4	11
Number of economic entities that used the services of BAS for innovation as a result of the intervention	0	12	33
<b>7. Does the project require the opening of a procedure pursuant to the Public Procurement Act (PPA)?</b>			
Yes			
<b>7.1. If a procedure under the Public Procurement Act is required, what part of the activities and financial resources will be subject of the public procurement?</b>			
<p>Public procurements may be announced in connection with the following activities:</p> <p>Activity 1.1. – Consulting services</p> <p>Activity 1.5. – Construction and installation work , infrastructure</p> <p>Activity 3.1. – Construction and installation work, communication infrastructure, software</p> <p>Activity 4.2. – Infrastructure, consumables</p> <p>Activity 8.3. – Organisational activities</p> <p>The indicative value of the financial resource related to public procurement is 46% of the value of the project.</p>			
<b>7.2. If a procedure under the Public Procurement Act is required, what is the indicative schedule for its implementation?</b>			
<p>Activity 1.1. – Stage 1</p> <p>Activity 1.5. – Stage 1 and beginning of Stage 2</p> <p>Activity 3.1. – Stage 1 and beginning of Stage 2</p> <p>Activity 4.2. – Stage 1 and Stage 2</p> <p>Activity 8.3. – Stage 2</p>			
<b>8. Demarcation and complementarity</b>			
<b>8.1. If similar projects have been implemented (regardless of their source of funding), describe how this project builds on/complements what has been achieved with previous projects.</b>			
<p>The thematic focus of the current project proposal corresponds to some completed or ongoing projects in which BAS participates.</p> <p>1. National Scientific Program "Low Carbon Energy for Transport and Life" - EPLUS (2018-2021). The program aims to consolidate the scientific community in three main themes:</p> <p>(i) Renewable energy storage and conversion, (ii) Electric vehicles and hydrogen mobility and (iii)</p>			

Effective methods for CO<sub>2</sub> capture and utilisation. In addition to BAS, the program involves Sofia University, the technical universities in Sofia and Varna, UCTM, University "Prof. Asen Zlatarov" - Burgas, Angel Kantchev University of Ruse and South-West University "Neofit Rilski"- Blagoevgrad. In addition to scientific tasks related to raising researchers' qualification, the program also develops demonstration projects, such as a hybrid-powered trolleybus. In this sense, EPLUS is a good prerequisite for the successful implementation of this project.

2. Project BG05M2OP001-1.001-0008 "National Centre for Mechatronics and Clean Technologies" aims to build a CoE which consolidates the research potential of Bulgaria's strongest research teams in the thematic divisions of mechatronics and clean technologies, as well as to attract suitable associate partners: business organisations from the country and scientific organisations from abroad. The project creates the country's most potent research infrastructure for high-quality research, development, and dissemination of R&D results, mainly by publishing them in renowned international journals and providing free access to them.

3. Project № BG05M2OP001-1.002-0014 "Centre for Competence HITMOBIL - Technologies and Systems for the Generation, Storage and Consumption of Clean Energy" is aimed at the development and accelerated introduction of innovative technologies for storage of energy from renewable energy sources and its efficient use through conversion into the home and industry, with an emphasis on electromobility. The implementation of the project aims to create an infrastructure for development, testing, optimisation and industrial implementation of modern systems for mobility and accumulation of renewable energy. The project is implemented by a consortium of 10 organisations coordinated by the Institute of Electrochemistry and Energy Systems - BAS.

4. Project BG05M2OP001-1.002-0011 Centre of Competence "Mechatronics and Clean Technologies MIRACLE". This project combines the efforts of 4 units of BAS, 3 universities as well as the Institute of Mechanics – BAS as a coordinator. It aims to build infrastructure for innovative high-tech research aimed at the business in the field of mechatronics and clean technologies: robotics and automation, biomechatronic systems, intelligent environments, processes and technologies in mechatronics, 3D modelling, development and implementation of pilot models of elements, details and systems for mechatronics.

5. Project BG05M2OP001-1.002-0023 Centre of Competence "Intelligent mechatronic, Eco- and Energy Saving Systems and Technologies" - IMEEST, which is implemented by 7 organisations (of which 3 units of BAS) with a coordinator TU-Gabrovo. The research of the project is aimed at applying energy-saving technologies that extend the life cycle and increase the operational safety of machine-building products, CAD / CAM systems for design and production of high-tech products, additive and energy-saving technologies and equipment, intelligent technologies based on energy-intensive flows, etc.

Three-quarters of the financial resources of projects 2-5 aim to build a modern infrastructure for competitive and high-quality research and development in areas closely related to the thematic focus (green and digital technologies) of this project. They will create the necessary conditions, primarily high-tech equipment and connectivity between research organisations (mainly institutes of BAS) and universities in the country, to undertake reform efforts to build a new model of the research sector's interconnectedness - education and business.

**8.2. If similar projects are envisaged to be implemented under the Partnership Agreement programs, the centrally managed facilities of EU or the Just Transition Fund, outline the demarcation with this project.**

The program for research, innovation and digitalisation for intelligent transformation for the

period 2021-2027 provides support for developing research organisations and universities in the direction of full participation in the national research and innovation ecosystem. The interventions are aimed at industrial research and joint business projects in the main thematic areas of the Innovation Strategy for Smart Specialization 2021-2027 by supporting the implementation of specific projects and the research organisations' capacity for these activities. Support is to be provided for technology transfer and internationalisation of scientific organisations' activities, both by expanding their participation in the Framework Program and other European and international partnerships and initiatives in the field of innovation and research. The dividing lines between the interventions under the operational program and the National Recovery and Resilience Plan are apparent; their observance will be monitored regarding programs, interventions and specific projects. The State Agency for Research and Innovation has a crucial role in ensuring coordination and synergy between the various funding instruments.

The Operational Program "Education" will provide support for doctoral programs and capacity building in this area, and the dividing lines between the two will be very closely monitored as well.

**9. Does the project directly contribute to the implementation of any of the Council's Specific Recommendations addressed to Bulgaria in the framework of the European Semester in the period 2017-2020? Please describe how.**

The activities aim to implement the following recommendations addressed to Bulgaria within the European Semester in the period 2017-2020.

*- Strengthen the link between science and industry, strengthen cooperation between businesses, academia, researchers and the public sector.*

Conditions are created for building multi- and interdisciplinary teams for effective cooperation between the units of BAS and research universities, business and public sector institutions, with a focus on establishing sustainable long-term relationships with business in the field of green technologies and digitalisation.

*- Increase public support for radical innovation, as well as for the creation and expansion of stable framework conditions for research and development in support of enterprises, with a view to enhancing market opportunities, competitiveness and increasing the innovation capacity of the economy.*

The implementation of the project, aimed at innovative developments in response to business needs and in fulfilment of the goals set by the Recovery and Resilience Plan for accelerating the green transition and digitalisation, will lead to an increase in public funds in support of creating stable framework conditions for R&D and innovation in strategic areas for the development of the country.

The innovative developments at the request of the business, which will be realised through the project, and the implemented green technologies will increase the competitiveness of enterprises, as well as the more efficient use of resources through the development of renewable energy sources. The training of qualified personnel through joint doctoral studies and intersectoral specialisations will increase the innovation capacity of the economy, which will have a positive effect on expanding the market opportunities of enterprises.

*- Focus investment-related economic policy on research and innovation, transport (particularly its sustainability), water, waste and energy infrastructure, and energy efficiency.*

Strengthening the innovation capacity of BAS and its more active participation in the national research and innovation ecosystem, building sustainable models for cooperation between BAS (independently or with research universities) and representatives of industry or other

stakeholders, achieving the planned results and impact will contribute to the formation of economic policy aimed at investment in R&D, transport, water, waste and energy efficiency.

*- Making more use of digital technologies can offer greener solutions for organising our economies and societies.*

The project supports the creation of green technologies based on modern digital solutions and establishes good (international) practices for the actual implementation of such technologies in practice.

**10. Does the project contribute to the implementation of a reform in a given sector? Please describe how.**

The reform in the sector of research and innovation is related to creating a new common policy for the development of research, innovation, and technology in support of the country's economic and social development. Policy planning and implementation links research with industry in order to create higher value-added products and services and bring about economic and industrial transformation.

The structural basis of the new policy is the establishment of the State Agency for Research and Innovation as a single centre for policy implementation and coordination of its contribution to other national policies related to the economic and industrial transition of the country.

The normative basis for the development of the reform in the field of research and innovation is the development and adoption of the Law on Research and Innovation. It builds on the current Research Act, expanding its scope and parameters with the priorities of the new common policy.

The strategic partnership with industry and the full participation of stakeholders is among the main elements of the reform. This is related both to the renewal of the functions and role of the Council for Smart Growth and to the establishment of an Innovation and Science Board at the State Agency to support the work of its President, as a barometer of needs and demand, both by business and the scientific community side. The members of the board will be a decisive factor, both in determining the strategic directions of cooperation between research organisations and business and in identifying critical projects for the development of the relationship between science and innovation.

The next component of the reform in research, innovation, and technology is the gradual increase in the share of the project and result-oriented funding of research organisations and universities. Increasing this share will happen by stimulating cooperation with industry and expanding the portfolio of opportunities for non-budgetary funding. As an approach, project financing is an important step towards introducing the monitoring and evaluation system in the work of scientific organisations and universities, which is a prerequisite for better efficiency and effectiveness of investments in them and channelling expertise and scientific capacity in crucial areas for specialisation.

The establishment and development of research universities are the basis for their full participation in the national research and innovation ecosystem and the opportunity for their positioning as an attractive centre for science development for young scientists and an accessible centre of interaction with industry in various sectors at a national and regional level.

The simplified and significantly more efficient process of knowledge and technology transfer is one of the most important components of the reform, which not only shortens the path of research to innovation and technology but is also a prerequisite for their commercialisation and rapid implementation in the economy, creating products, services and technologies with high added value. Our country has received valuable recommendations in this area from both the World Bank and the Joint Research Centre, which serve as a starting point for developing and implementing a new model to promote technology transfer. It builds on effective interaction with industry and is linked to the various models and practices of intellectual property and rights management, facilitating business's access to scientific knowledge and the access of research organisations to additional funding and supply with new ideas and demand orientation.

The development of human potential and capacity in the field of research and innovation, together with internationalisation activities, are considered as horizontal elements of each of the mentioned components of the reform.

The proposed project contributes to the implementation of the individual elements of the reform in research, innovation, and technology. It leads to a change in the model of interaction between research organisations in BAS and business.

The project is focused on developing the research and expert potential of BAS and its effective use for innovation, building mechanisms to stimulate technology transfer, strengthening the interdisciplinary and cross-sectoral approach, as well as the internationalisation of innovation efforts. The indicated priorities and activities in the project are directly aimed at applying the scientific results favouring business development. The implementation of the tasks will contribute to stimulating innovation, increasing the capacity of researchers related to their applied activities, as well as to strengthening the links with Bulgarian companies and manufacturers. The implementation of the project is expected to create a basis for a new model of development of the research and innovation ecosystem, with close and sustainable interaction with business, which will accelerate the transformation of the economy into a knowledge-based economy and which will inevitably have a strong impact on its competitiveness and will contribute to the country's transition to "moderate innovators".

Reform in the sectors affected by the Green Deal:

The activities in the project contribute to the implementation of the Green Transition, one of the main goals of the Reconstruction and Development Plan. In line with the ambitious goals of the European Green Deal, the project will help implement the European roadmap towards a climate-neutral circular economy in which economic growth is based on resource efficiency.

**11. Does the project contribute to the development of any aspect of sustainable economic development? Please describe how.**

The project contributes directly to sustainable economic development through:

- Creation of green technologies with a high level of technological readiness at the request of the business,
- Support for applied research for the implementation of innovative green technologies in practice,



- Contribution to resource efficiency,
- Contribution to digital transformation as a prerequisite for sustainable development,
- Support for cooperation with international partners in order to transfer to Bulgaria best European practices to maintain high environmental standards.

**12. Does the project contribute to the implementation of the objectives of the National Development Program BULGARIA 2030? Please describe how.**

The project is directly related to several of the priorities of the National Development Programme: Bulgaria 2030:

**Priority P2 Research and research infrastructure**

Achieving high quality and effective research is a key sub-priority in P2. The realization of high-quality applied science research, the increase of the efficiency and the consolidation of the scientific research in areas which are strategic for the country is the basis for the realization of the project goal. The project also aims at achieving a new level of interconnection between the participants in the research and innovation ecosystem as well as building sustainable mechanisms for interaction with business in order to attract private investments and transfer/commercialisation of scientific results. Increasing the relative weight of the results of applied research in the attestation criteria of the units and scientists of BAS is in line with the international practices for attestation of research universities and organisations.

Among the specific objectives of the project is to strengthen the participation of BAS units in EU **competitions** and initiatives and to deepen the **internationalisation** of R&D, as a result of which the success rate of the project proposals under the Framework Programme open calls will increase, and wider participation into the European research area as well as strengthening and/or building partnerships and networks with foreign organisations and institutions will be achieved. These objectives are fully compatible with sub-priority 2.2: Internationalisation and participation in the European Research Area.

Building research infrastructure is not the focus of the project. It is envisaged to purchase equipment to support only innovation activities and those related to technology transfer, i.e. there will be no duplication of existing equipment in CoE, CoC or Sofia Techpark. Furthermore, the ambition is to implement a shared and effective use of the developed research infrastructure of BAS and universities while observing access rules and the requirements of the state aid framework.

Upgrading the skills of the research staff and developing capacity for technology transfer is among the main highlights of the project. It is envisaged that this activity will cover researchers at different stages of professional development, including doctoral students, which aims to retain young researchers, attract prominent scientists and experts through the introduction of modern forms of education and training through interdisciplinary and intersectoral approach, exchange of good practices and experience, etc. These activities coincide with sub-priority 2.4: Research staff.

**P3 Smart industry**

The implementation of the project is expected to support the creation of prerequisites for raising

the technological level of Bulgarian products, specialisation in products and industries characterized by high technological and R&D intensity, as well as the development of the innovation ecosystem, i.e. to have a major impact on building the country's innovation network, as well as on the internationalisation of the innovation process.

#### **P4 Circular and low carbon economy**

The main thematic focus of the project is in the field of green technologies which includes research and development of waste-free and low-carbon technologies, waste recovery and recycling, the use of renewable energy power sources, production of green hydrogen, etc., ecological transport aiming to reduce environmental pollution and to use resources more efficiently.

### **13. Does the project contribute to the implementation of the objectives and priorities set out in the National Integrated Energy and Climate Plan? If yes, please describe how.**

The present project is directly related to the "Research, Innovation and Competitiveness" dimension of the national general and specific objectives of NECP and is a response to the aspiration of the Plan to accelerate the introduction of new energy technologies. BAS offers a programme to strengthen the transfer of knowledge from science to industry in order to achieve a faster transition to clean and highly efficient energy technologies. The thematic focus of the project supports the implementation of the goals set by the Bulgarian state in the field of research, innovation and competitiveness in the integrated National "Energy and Climate" Plan:

- development of a low-carbon economy in the long run;
- encouraging the creation of innovations, their market realisation and the technological renewal of enterprises;
- support of local industry for the introduction of low-carbon technologies and of the public-administrative and household sector for the use of new highly efficient energy-saving technologies;
- improving the air quality;
- introduction of new thermal insulation materials for glazed surfaces;
- increasing the competitiveness and market positions of the Bulgarian industry, as well as encouraging the development of innovative productions with high added value;
- development of electric cars and hydrogen technologies.