

**Objectives of National Priorities of Oriented Research, Experimental Development, and Innovation of National Centres of Competence Programme First Public Tender**

Ref. No.: TACR/1-45/2018

The Beneficiary selects from the National Priorities of Oriented Research, Experimental Development, and Innovation (RDI Priorities) one main and zero to two secondary objectives which will benefit the most out of the project implementation, i.e. achieving objectives and outcomes of the Project. The selected objectives may be from different areas and sub-areas.

Priority Area	Area	Sub-Area	RDI Objectives
PA 1 – Competitive knowledge-based economy	1. Application of new knowledge from the area of General Purpose Technologies	1.1 GPTs for innovation of processes, products and services	1.1.1 To gain new utility values of the products by using new findings from area of GPTs
			1.1.2 To improve efficiency, safety, sustainability and reliability of processes (including lowering of energy intensity and costs of material) by using GPTs
			1.1.3 To streamline offered services and processes in direct

Priority Area	Area	Sub-Area	RDI Objectives
			services by using GPTs
			1.1.4 Increase in efficiency of services and processes in public sector using GPTs
	2. Strengthening of sustainability of production and other economic activities	2.1 Efficiency, effectiveness and adaptability	2.1.1 To increase economy, efficiency and adaptability in transport - transport and handling systems and vehicles production to make these areas globally competitive
			2.1.2 To improve economy, efficiency and adaptability in industries to empower global competitiveness in this area
2.1.3 To improve economy, efficiency and adaptability in electrical engineering, including IT industry and services to empower global competitiveness in this area			

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			2.1.4 To improve adaptability of products by cross departmental	
		2.2 Use values of products and services	2.2.1 To innovate products in the branches important for export by joint activities of manufacturing and research areas	
			2.2.2 To improve competitiveness of products and services by improving their use values	
	3. Strengthening of safety and reliability	3.1 Safety and reliability of products and services		3.1.1 To establish complex policy to safety and reliability of products and services
				3.1.2 To improve reliability and safety of network systems by development and introduction of smart networks
		3.2 Safety and reliability of		3.2.1 To gain permanently high

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		processes	<p>degree of the data protection and communication security in a dynamically changing environment</p> <p>3.2.2 To increase use and quality of autopilots and automation</p> <p>3.2.3 To increase quality of process monitoring and early warning systems</p> <p>3.2.4 To increase security and reliability of processes by using simulator and virtual reality means to gain significant reduction of both direct and indirect costs caused by their failures</p>
	4. Mapping and analysis of competitive advantages	4.1 Identification of the new opportunities of competitive advantage	4.1.1 Actual identification of the economic opportunity by the continuous global trends monitoring and scoring

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PA 2 – Sustainability of energy and material resources	1. Sustainable Energy	1.1 Renewable energy sources of the energy	1.1.1 Development of the economically efficient solar energetics
			1.1.2 Development of the economically efficient geothermal energetics
			1.1.3 Development of the economically efficient use of the biomass
		1.2 Nuclear resources of the energy	1.2.1 Efficient long-term use of nowadays nuclear power plants
			1.2.2 Support of the security of the nuclear facilities
			1.2.3 Research ensuring support of the construction and running of the new economically efficient and secure blocks
	1.2.4 Research and development		

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			of the fuel cycle
			1.2.5 Deposition of the nuclear waste and used combustibles
			1.2.6 Research and development in the area of reactor of the IV generation, mostly effective and secure fast reactors
		1.3 Fossil resources of the energy	1.3.1 Economically efficient and ecological fossil energetics and heating industry
		1.4 Power lines including power accumulation	1.4.1 Capacity, reliability and safety of the spinal power lines
			1.4.2 Modification of the lines for the „demand-side management“
			1.4.3 Power accumulation including use of the hydro energy
			1.4.4 Safety and durability of the

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			power lines
		1.5 Production and distribution of the heat / coldness including cogeneration and trigeneration	1.5.1 Heat withdrawal from power stations in the basic load
			1.5.2 Effective cogeneration (trigeneration) in SCZT sources in works with partial load (system services)
			1.5.3 Distributed combined production of the energy, heat and coldness from every kind of resources
			1.5.4 Transport and accumulation of the heat
			1.5.5 Efficient management of the modification of the indoor environs

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			1.5.6 Alternative resources - exploitation of wastes
		1.6 Energy in the transport	1.6.1 To increase the quotient of the agro fuel as a compensation for the fossil sources
			1.6.2 To increase the quotient of the use of the electric energy in the transport as a compensation for fossil sources
			1.6.3 To establish in the perspective the use of hydrogen as a transport power source
		1.7 System development of the Czech energetics in the context of the development of the EU energetics	1.7.1 System analysis for the support of the balanced state energetics conception (SEC), another related strategic documents of the state and regional developing concepts considering the EU frame



Priority Area	Area	Sub-Area	RDI Objectives
			1.7.2 Integral conception of the development of the municipalities and regions with the verification with the demo projects (linked to the SET Plan – Smart Cities and Smart Regions)
	<b>2. Lowering the energetic demands of the economy</b>	2.1 Lowering the energetic demands of the economy	2.1.1 Energy budget of the materials and fuels for the whole stroke
			2.1.2 Research and development of the new energy saving industrial technologies
			2.1.3 Increases in the use values and durability of the buildings
		2.2 New technologies and processes with a potential utilisation in the economy	2.2.1 Participation of the R&D in the international activities in the area of the utilisation of the nuclear fusion
	2.2.2 New methods and		

Priority Area	Area	Sub-Area	RDI Objectives
			procedures in the area of the diagnostic to increase the reliability, security and durability of the energy devices
			2.2.3 Biotechnology, bioengineering and genetics
	3. Material base	3.1 Advanced materials	3.1.1 Long-term perspective of the provision of the raw materials for the economy of the Czech republic
			3.1.2 Advanced materials for the competitiveness
			3.1.3 Innovation and sustainability of the classical materials
			3.1.4 Use of the nanomaterials and nanotechnologies
	PA 3 – Environment for quality	1. Natural Resources	1.1 Biodiversity

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## National Centres of Competence Programme

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life			efficiency of the particular territorial natural and landscape preservation leading to the support of the metapopulations of decreasing threatened species and species with the focal point of occurrence in the biotopes created or strongly influenced by humans
			1.1.2 Formation of the efficient kinds of measures to maintain natural associations and natural biotopes of species
			1.1.3 Valuation of the impact of the plant and animal invasions and development of the instruments for their limitation
			1.1.4 Valuation, survey and categorization of ecosystem

Priority Area	Area	Sub-Area	RDI Objectives
			services including creation of the instruments for valuation of their fact accuracy and practical utility
		1.2 Water	1.2.1 Reduction of the water pollution from point and non-point sources and the sustainable use of the water resources
		1.3 Soil	1.3.1 Increase of the content of the stable organic mass and the support of functional diversity of soil organisms with collateral maintenance of the productivity character of soil
			1.3.3 Increase of the retention ability of the wetland soil and implementing of the retention zones
		1.4. Air	1.4.1 Limitation of the emissions of polluting substances from anthropogenic sources

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			1.4.2 Gadgetry of the spread and deposition of the polluting substances
		1.5 Mineral deposits and effects of mining on the environment	1.5.1 Enforcement of the sustainability of the procurement with mineral primary commodities
	2. Global Changes	2.1 Methods of mitigation and adaptation for global and local changes	2.1.1 Proposition of the adaptive measures in the particular sector of the economy of the Czech Republic and proposition of the instruments for GHG emissions lowering
		2.2 Biogeochemical cycles of nitrogen and phosphor	2.2.1 Optimisation of the streams of the reactive forms of nitrogen and phosphor (Nr a Pr)
		2.3 Dangerous substances in the natural environment	2.3.1 Natural environment and health
	3. Sustainable development of	3.1 Green infrastructure -	3.1.1 Creation of the conceptual

<b>Priority Area</b>	<b>Area</b>	<b>Sub-Area</b>	<b>RDI Objectives</b>
	landscape and human settlements	stable structure of the landscape	instruments of the landscape planning
		3.2 Agriculture and forestry	3.2.1 Acquirement of practically useful information for effective agricultural production in the ecologically and economically long-term sustainable systems of farming
		3.3 Urbanism and intelligent human settlements	3.3.1 Design of modern methods and systems of construction and keeping of the intelligent human settlements with minimum impacts on the environment
	4. Environmental technologies and eco-innovation	4.1 Environment-friendly technologies, techniques and materials	4.1.1 Technologies and products increasing complex efficiency of the exploitation of primary sources
		4.2 Biotechnology,	4.2.1 To gain qualitatively new

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		material, energetic and emissive efficient technologies, products and services	primal product by using biotechnological methods
			4.2.2 To prepare biotechnological methods for the complex wasteless use of the biomass
		4.3 Minimisation of the waste production and their re-use	4.3.1 New recycling technologies – their output being substances with comparable quality to the input raw materials
			4.3.2 New effective methods of energetic use of wastes with a minimisation of the negative environmental influences
		4.4 Removing of the dangerous substances - old damages from the environment	4.4.1 Increase of the efficiency of the redevelopment technologies and introduce of the new methods of redevelopment
		4.5 Minimisation of the	4.5.1 Technology for the

Priority Area	Area	Sub-Area	RDI Objectives
		chemical substances risk	minimisation of the risks of the POPs, toxic metals, hormonal disruptors, pharmaceutical residuals, pesticides and another pollutants for the human health and life organism
			4.5.2 Technologies for replacement of the risk substances under the REACH legislation and replacement of the dangerous substances by less harmful
	5. Environmentally friendly company	5.1 Patterns of consumption of the population	5.1.1 To develop efficient methods for the change of patterns of consumption in the direction of minimisation of the effects of consumption on the stable function of natural resources and eco- system services
		5.2 Measures of the	5.2.1 To design innovative



<b>Priority Area</b>	<b>Area</b>	<b>Sub-Area</b>	<b>RDI Objectives</b>
		environment-friendly growth	instruments of the environmental preservation with the target of minimisation of the costs of their functioning
PA 4 – Social and cultural challenges	1. Demographic and Social Changes	1.1 Demographic ageing, family policy	1.1.1 Implementation of complex support of active ageing
			1.1.2 Improvement of reproduction potential of the population by improving the value of family in society and improving the efficiency of fertility support
			1.1.3 Prediction and evaluation of impacts of significant population fluctuations and territorial inequalities
		1.2 Marginalization and integration of socially disadvantaged groups	1.2.1 Prevention of deprivation, exclusion and segregation
1.2.2. Lessening of the impact and			

Priority Area	Area	Sub-Area	RDI Objectives
			depth of exclusion, marginalization and stigmatization
		1.3 Social inequalities, cohesion and social state	1.3.1 Improvement of the equality of conditions in access to education and labour market, housing, social security and services
		1.4 Migration, mobility and territorial cohesion	1.4.1 Efficient use of migration potential
			1.4.2 Improvement of territorial cohesion
	2. Government and Administration	2.1 Citizen, state and society	2.1.1 Legitimate political system
			2.1.2 Legitimate legal system
			2.1.3 Legitimate socio-economic system
		2.2 Public policies and	2.2.1 Functional and efficient

Priority Area	Area	Sub-Area	RDI Objectives
		administration	public policies and environment
	3. Culture, Values, Identity, and Tradition	3.1 Changes in value structures and ethics	3.1.1 Changes in basic ethical principles of life in society
			3.1.2 Philosophic and sociologic reflection of the media influence on the change of human life and forming of society
		3.2 National, regional and local identity and tradition	3.2.1 Knowledge of history as a prerequisite of keeping a national, regional and local identity, memory and tradition in a national context
			3.2.2 Research of language and literature as a tool for maintaining identity
			3.2.3 Creative historical and theoretic reflection of artistic work

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		3.3 Material and immaterial cultural heritage	3.3.1 Active protection of the cultural heritage
			3.3.2 Reception of cultural heritage as a tool of national self-awareness and state representation
		3.4 Religion	3.4.1 Reflection of the role of religion in current Czech society in a global context
	4. Development and Use of Human Potential	4.1 Education, upbringing, lifelong education	4.1.1 Set new educational goals
			4.1.2 Establish a fully functional system of lifelong education
		4.2 Labour market and employment policy	4.2.1 Employment policy increasing the competences of the workforce and increasing the absorption capacity of the labour market
			4.3 Protection and

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		support of human health	cross-departmental system of protection and support of the health of the population
	5. Man, Science, and New Technologies	5.1 Possibilities and conditions for the development of research, development and innovations	5.1.1 Analysis of the effect of knowledge in the Czech social system
		5.2 Adaptability of man and society to new technologies	5.2.1 Adaptation to new technologies
PA 5 – Healthy population	1. Origin and Development of Diseases	1.1 Metabolic and endocrinal diseases	1.1.1 Aetiology and pathophysiology of insulin resistance
			1.1.2 Aetiology and pathogenesis of immunity-based endocrinal diseases
			1.1.3 Pathogenesis and treatment of diabetes complications

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		1.2 Circulatory system diseases	1.2.1 Clarification of etiologic factors and pathophysiologic events affecting the origin and progress of cardiovascular and cerebrovascular diseases
		1.2.2. Development of early diagnostics of cardiovascular and cerebrovascular diseases and discovery of therapeutic modalities and processes in therapy of cardiovascular and cerebrovascular diseases with higher therapeutic efficiency and which is also more patient-friendly	
		1.3 Cancer diseases	1.3.1 Cancer biology in relation to diagnostic and therapeutic goals
		1.3.2 Analysis of relations host-cancer as a tool to individualize diagnostics and treatment	

Priority Area	Area	Sub-Area	RDI Objectives
		1.4 Neural and psychic diseases	1.4.1 Psychic and neurologic diseases
			1.4.2 Diagnostic of neural system
			1.4.3 Improved efficiency of treatment methods of neural system diseases
			1.4.4 Ensuring the quality of life of patients with neural system diseases
		1.5 Motoric system and infectious immunologic diseases	1.5.1 Aetiology and pathogenesis of degenerative and metabolic diseases of the motoric system
			1.5.2 Definition of risk factors of the origin of allergic diseases and identification of new goals of targeted treatment of these diseases
		1.6 Infections	1.6.1 Aetiology and pathogenesis

Priority Area	Area	Sub-Area	RDI Objectives
			of significant infectious diseases
	2. New diagnostic and therapeutic methods	2.1 In vitro diagnostics	2.1.1 Deepening of the knowledge in the area of -omic and high capacity methods
			2.1.2 New IVD technologies
		2.2 Low-cellular treatment	2.2.1 New low-cellular compound
			2.2.2 Identification of new therapeutic goals, new methods and procedures for biologic testing
		2.3 Biological medicaments including vaccines	2.3.1 New vaccines for prevention and treatment of diseases and addictions
		2.4 Drug delivery systems	2.4.1. Development of new carriers for directed administration and transportation of drugs



Priority Area	Area	Sub-Area	RDI Objectives
			2.4.2 Systems for overcoming biologic barriers and chemo-resistant diseases
		2.5 Genetic, cellular therapy and tissue replacements	2.5.1 Sources of cellular and tissue therapy
			2.5.2 Methods of differentiation and genetic modification of cells/tissues
			2.5.3 Biomaterials
		2.6 Development of new medical instruments	2.6.1 Electric and magnetic mapping and stimulation
			2.6.2 Endovascular procedures
			2.6.3 Navigational and robotic system, neurostimulants. Improved accuracy and supervision of invasive techniques
		2.7 Innovative surgical	2.7.1 Surgical procedures and

Priority Area	Area	Sub-Area	RDI Objectives
		procedures including transplantations	transplantations
			2.7.2 Non-invasive treatment
	3. Epidemiology and prevention of the most serious diseases	3.1 Metabolic and endocrinal diseases	3.1.1 Evaluation of the impact of preventive measures on the origin of the most frequent metabolic disorders
			3.2 Circulatory system diseases
		3.2 Circulatory system diseases	3.2.1 Population study: disease data
			3.2.2 Population intervention, assessment of the influence of preventive measures
		3.3 Cancer diseases	3.3.1 Screening and prevention of cancers
			3.3.2 Identification of risk factors and individuals in the population
3.4 Neural and psychic	3.4.1 Population study: disease		

Priority Area	Area	Sub-Area	RDI Objectives
		diseases	data
			3.4.2 Population intervention, assessment of the influence of preventive measures
		3.5 Motoric system and infectious immunologic diseases	3.5.1 Epidemiology of degenerative and metabolic diseases of the motoric system
		3.6 Addictions	3.6.1 Ties
			3.6.2 Social impact
		3.7 Infections	3.7.1 Epidemiology of infectious diseases
			3.7.2 Domestic and imported food as a source of infections
PA 6 – Safe society	1. Safety of citizens	1.1 Protection of citizens	1.1.1 Support of measures and tasks of citizen protection
			1.1.2 Improvement of protection

Priority Area	Area	Sub-Area	RDI Objectives	
			tools and services	
			1.1.3 Security of towns and municipalities, informing, education and motivation of citizens	
		1.2 Protection against crime, extremism and terrorism	1.2.1 Creation of useful methods of analysis of types and spread of crime and implementation of efficient tools of its suppression	
	2. Security of critical infrastructures and resources	2.1 Protection, resistance and restoration of critical infrastructures		1.2.2. Minimizing cybernetic crime and data abuse
				2.1.1 Development of alternative and emergency crisis processes
				2.1.2 Improvement of the CI resistance
		2.1.3 Ensuring and developing CI interoperability		

Priority Area	Area	Sub-Area	RDI Objectives
			2.1.4 Efficient detection and identification of threats
			2.1.5 Development of ICT, telematics and cybernetic protection of CI
		2.2 Communication and ties between CI	2.2.1 Mutual dependences of CI systems
			2.2.2 Informational support of detection of possible unfavourable influences
	3. Crisis management and security policy	3.1 Development of the state security policy and the Czech Republic's security system	3.1.1 Evaluation of the efficiency of strategic management and assessment documents in the security field
			3.1.2 Support of adaptability of the Czech security system to changes in the security environment and emerging new security threats

Priority Area	Area	Sub-Area	RDI Objectives
		3.2 Assessment of risks and threats, creation and development of scenarios, procedures and measures	3.2.1 Analysis of security threats and creation of scenarios of the development of the global, European and Czech security situation
			3.2.2 Support of specific security areas
		3.3 Systems of analysis, prevention, response and restoration	3.3.1 Improvement of systems of gathering and sorting information
			3.3.2 Analysis of security information
			3.3.3 Improvement of the efficiency of the security system and crisis management
			3.3.4 Improvement of systems of restoration support
			3.4. Legislative and legal

Priority Area	Area	Sub-Area	RDI Objectives
		problems	measures in case of a threat to the inner state security, extraordinary natural or anthropogenic events and crises
	<b>4.Defence, defensibility and deployment of armed forces</b>	4.1 Development of the abilities of the armed forces	4.1.1 Development of new weapon and defence systems
			4.1.2 Preparation, mobility and sustainability of the armed forces
			4.1.3 Support of command and management
			4.1.4 Development of communication and information systems and cybernetic defence