

Science, Technology and Innovation Policy Program

The Science, Technology and Innovation Policy (STIP) Program of ARC Fund facilitates public, multi-actor deliberative processes on societal challenges stemming from research and innovation. It mobilizes actors from civil society, business, university and research organizations, as well as policy and decision-makers, towards a shared understanding of forthcoming transformations and challenges in technological developments and innovations, and steers them towards a shared vision for the integration of responsible research and innovation principles into science and policy-making. In 2019 the program focused on:

- Promoting broader understanding of the public implications of the precautionary principle as a governance mechanism to proactively safeguard the environment and human health, and looking into the trade-offs between precaution and innovation across sectors, stakeholder groups, and citizens.
- Continuing development of capacities and expertise in technology assessment by broadening partnership networks and committing to joint initiatives focused on understanding science, technology and innovation and delivering knowledge-informed policy advice.
- Further integrating principles of Responsible Research and Innovation (RRI) on an organizational level, as well as on territorial policy level, by enabling territorial actors to develop decision systems based on responsibility, anticipation and inclusivity.
- Building solid capacities of research and innovation actors across the Danube macro-region to initiate, prepare, manage and successfully deliver complex projects, and enhancing the capacities and visibility of regional research infrastructures.

The precautionary principle – reconciling science, public concerns and policy-making through stakeholder consultation and mobilization

The *precautionary principle* allows regulatory oversight over scientific and technological developments, whose practical applications are frequently the source for public concern for, or are believed to cause, harm to human health or the environment. Subject to the principle's invocation as part of decision-making are identified hazards without a certain, proven cause, coupled with high stakes.

In June 2019, ARC Fund mobilized citizens to reflect on issues concerning fairness, risk and safety in relation to research, precaution and innovation, and to share their ideas and opinions. A diverse group of twenty-seven citizens learned about the most highly contested topics and precautionary measures in place – GMOs, nanotechnologies and systemic pesticides being among the most notorious examples. ARC Fund gathered their feedback into a summary report

detailing the scope of different perceptions of the interplay between precaution and innovation.

In the last quarter of 2019, ARC Fund commenced research on the relevance of the precautionary principle in regulations focusing on genetically modified organisms, where there is a vast discrepancy between scientific confidence in safety and technological capability, on one hand, and the public's perception of harm to individual health, consumption choices, and ecosystem sustainability on the other hand. ARC Fund reviewed current conflicting perspectives on GMOs, the state of regulatory frameworks in the EU, and the opinions of major stakeholder groups to lay the foundation of a comprehensive case study on the relevance, application and motivations behind the use of the precautionary principle in regulating GMOs through policy.



Citizens gathered together to discuss whether and how public policies can ensure better precaution, 23 June 2019

Technology Assessment as Knowledge-Informed Policy Advice

ARC Fund's Program Director Zoya Damianova delivered the keynote speech to a joint conference of the German-speaking Technology Assessment institutes in May 2019. She spoke about the changing role of and the evolving expectations to technology assessment within a mission-driven research context, and encouraged the conference participants to anticipate more closely some of the challenges that national technology assessment institutes are expected to face after 2021.

Also in 2019, ARC Fund joined the newly established international GlobalTA network, which brings together science and technology research institutes from across the globe to promote innovation and knowledge-based strategies to tackling the most

pressing societal challenges. ARC Fund continues to be the only Bulgarian institute that is involved in technology assessment initiatives that support policy and decision-making on issues related to scientific uncertainty, technological advancement and innovation diffusion.

In November 2019, ARC Fund was among the delegates to the **4th Biennial International Technology Assessment Conference**, having already contributed to the prior three since 2013. The Program Director Zoya Damianova spoke as part of a panel on Value-driven Innovation Approaches on the topic of **"The added value of public engagement in the development of sustainability-focused research policy and programs."**

Leadership in Responsible Research and Innovation

In 2019 ARC Fund continued integrating principles and practices of Responsible Research and Innovation in its scope of work. The team developed a mapping methodology to enable targeted collection of data about local actors, policies, good practices and risk and opportunity factors that was

used across five EU regions and municipalities – the city of Gabrovo in Bulgaria, the region of Emilia Romagna in Italy, the region of North-East Romania, the region of Central Macedonia in Greece and the County of Trøndelag in Norway.

Building capacities for research and innovation management in the Danube macro-region

ARC Fund successfully delivered a blended learning course, part of an extended edu-



Mr. Kozarev presenting policy recommendations for the strengthening of national capacities in R&I project management, July 2019

cational offering for aspiring research and innovation managers across the Danube region. Following a year-long study program, two Bulgarian participants received their certificates as R&I project managers at a ceremony at the Charles University in Prague, as part of a pre-selected cohort of young research and innovation managers.

ARC Fund also finalized the Strategy and Roadmap for the Development of National Capacities for Research and Innovation Project Management. STIP's Program Manager Ventseslav Kozarev introduced the document to an open stakeholder meeting, hosted in Prague by Charles University.

Enhancing the capacity of research infrastructures

Science, technology and innovation (STI) funding systems of many countries in the Danube macro-region are still affected by a number of problems. Among the most important ones is the unsatisfactory quality or the very absence of adequate ex-ante evaluation, monitoring and impact oriented assessments of STI programs and specifically of the research infrastructures (RIs).

Throughout the year ARC Fund:

- Prepared three guidance documents (Ex **Ante Evaluation for Research Infrastructures; Monitoring of Research Infrastructures; Assessment of Socio-Economic Impacts of Research Infrastructures**) and two sets of policy recommendations (**Recommendations for RI Managers** and Recommendations for Policy-makers): ARC Fund coordinated the work of the international Thematic Group preparing the Guidance Document for Assessment of the Socio-economic Impacts of Research Infrastructures. The guide provides details about and advice on how to organize and manage the process of assessing the socio-economic impacts of RIs.
- Organized and implemented trainings to build capacity for evaluation, planning, monitoring and management of research infrastructures: although the trainings, attended by over 100 policy-makers, RI operators and coordinators, and RI reviewers from 14 countries, took place in 2018, the training materials were promoted on different events in 2019.
- Registry of research infrastructure reviewers: ARC Fund developed a database with information about almost 200 qualified and experienced experts able to evaluate research infrastructures in the Danube region countries. The Registry is intended for the use of ministries in charge of science, research and technology, science and research funding authorities, and agencies in charge of research infrastructures, but also for research organizations seeking RI investments. A restricted version of the database (containing no names and contact information of reviewers) is **freely accessible**, but the contact with the reviewers can be established only through ARC Fund.
- ARC Fund facilitated a mutual peer learning exchange between the Institute of Oceanology (at the Bulgarian Academy of Sciences) in Varna and the Faculty of Civil Engineering at the University of Rijeka, Croatia, both managing large research infrastructures. The results and recommendations from the peer learning visits were presented on the international Know-how Exchange Forum in Bratislava.

Transforming energy consumption patterns in household

In 2019, ARC Fund continued raising households' awareness on how to consume energy in a more conscious way and how to improve the energy efficiency at home. The team contributed to the further development of the ACT4ECO online platform that targets EU households and helps them to learn about smart energy consumption. The platform is an open access one so that users

interested in any of the topics would have the opportunity to sign in and explore its contents.

As one of the main content contributors to the platform, ARC Fund developed guidelines on the topic of prosumerism and energy self-generation at home. The guidelines provided an overview of three current tech-

The ACT4ECO platform is accessible at <https://staging.act4eco.eu/>

nologies-in-use for home-based energy self-generation (solar water heating systems, photovoltaic systems and micro combined heat and power systems), making users aware of the opportunities these technologies offer and enabling them to self-assess how each technology might be suitable to their needs.

ARC Fund contributed to international research that has been instrumental in developing a greater understanding of how and why people use energy in their everyday lives, and to what effect. The team documented the outcomes of this research and practical work in several open access publications:

- **National Summary Brief** – Bulgaria presents the energy profile of the country, with an overview of the most important national sustainable energy consumption initiatives, provides a detailed description of selected good practices and concludes with a summary of major nationally specific trends and their implications for energy consumption policies.
- The book **Energy Demand Challenges in Europe: Implications for policy, planning and practice** examines the role of citizens in sustainable energy transitions across Europe. ARC Fund's experts Marko Hajdinjak and Desislava Asenova wrote a chapter reflecting on the challenges and trends in sustainable energy consumption

and energy poverty in Bulgaria. The book further explores energy problem framing, policy approaches and practical responses to the challenge of securing clean, affordable and sustainable energy for all citizens, with households as the main unit of analysis.



- **Methodology, experience and lessons learned** presents the Living Labs methodology used to observe and analyze practices of household energy use and test the efforts to adopt more sustainable routines at home. The publication discusses lessons learned and reflects on how this methodology could contribute to a sustainable future.



ARC Fund's Senior Analyst Marko Hajdinjak took part in the annual conference of the European Network for Research, Good Practice and Innovation for Sustainable Energy (ENERGISE), October 2019

Strategic development and networking

In 2019 ARC Fund further strengthened its organizational network in Bulgaria and across the EU and EEA, expanding it further by starting collaboration with more than 20 new partners from universities, local and regional authorities, research institutes and SMEs. The team was involved in several new

research and innovation projects under the Horizon 2020 program, extending further its more than 100-strong partnership network and enabling the team to offer its rich expertise to new challenges, new locations and across practice areas.



The Certificate from the Ministry of Education and Science attesting to ARC Fund's performance under EU's Framework Programs in 2019.

ARC Fund was one of the eight organizations, which initiated the European Workplace Innovation Network (EUWIN) in the period 2012 - 2017. The collaboration between the partners continued, and after 2017 focused on promoting the issue of workplace innovation at the European Union level.

Also in 2019, for another year in a row, ARC Fund was recognized by the Ministry of Education and Science as being the most successful Bulgarian non-profit research institute, owing to its productive involvement in more than ten research and innovation projects under the Horizon 2020 program (since the program's inception in 2014).