

# Science, Technology and Innovation Policy Program

The Science, Technology and Innovation Policy Program of ARC Fund is involved in public debates on the challenges faced by research and innovation stakeholders. It mobilizes actors from civil society, business, universities 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 2018, the program focused on:

- **Advancing responsible research and innovation**

In 2018, ARC Fund completed a year-long study of the current state of and trends in RRI in the Bulgarian science, research and innovation landscape. The study confirmed that the RRI concept remains largely unknown beyond the community of policy-makers and researchers thoroughly familiar with EU funding programs. On the other hand, it noted that this community is growing both in terms of size and in scope of action – a process ARC Fund has successfully promoted and encouraged.

- **Transforming household energy consumption culture and raising energy consciousness of consumers**

ARC Fund, supported by several of its partners, examined and classified 1067 sustainable energy consumption initiatives, creating an open-access online database as an invaluable resource for energy practitioners, researchers, community groups or anyone seeking good practice examples of energy initiatives from all over Europe. Bulgarian households were found to be active participants in top-down initiatives, but much less willing to self-organize and cooperate with their neighbors and fellow citizens.

- **Developing research infrastructures**

Insufficient capacity to evaluate research infrastructures (RI), monitor their operation, and assess their socio-economic impacts is a common problem for most countries in the Danube region, including Bulgaria. ARC Fund took part in a pilot initiative on mutual learning between research infrastructure managers from several countries in the Danube macro-region. It also contributed to the setting up of a Registry of research infrastructure reviewers, with 192 experts from the region already approved for inclusion.

- **Building national capacities for project management of research and innovation projects**

In 2018, ARC Fund performed an in-depth analysis of national capacities for research and innovation projects in the countries of the Danube macro-region. A persistent issue in all countries is the decoupling of scientific excellence from project management, with either one or the other taking precedence in the working practices of both researchers and project managers. In an effort to alleviate that gap, ARC Fund contributed to the design of a comprehensive pilot course on the management of research and innovation projects tested with 25 young project managers from the region.

### *Advancing Responsible Research and Innovation*

Responsible research and innovation (RRI) is an important policy concept, having emerged in recent years as a framework to address grand societal challenges through the wider engagement of societal actors in the field of science and innovation. Most of the RRI keys (ethics; societal engagement; gender equality; open access; science education) have long been incorporated into the research practice in the country.

In 2018, ARC Fund successfully completed two large-scale citizen engagement based initiatives, drawing valuable policy lessons. These demonstrated the potential of involving citizens in discussions on topics that are traditionally the domain of science – i.e. nanotechnology, food security, bio-economy, and sustainable futures. The findings were presented to policy stakeholders from the European Commission and informed EU policies on responsible research and innovation, whereby citizen engagement is a core pillar. ARC Fund further strengthened its capacity to deliver sound methodologies that focus on the study of interfaces between science, society and public policy, and delivered strong evidence for the importance of considering citizen input as a valid knowledge source.

ARC Fund also studied the current state and trends in RRI in Bulgaria. The concept of RRI is mostly known among policy-makers and researchers professionally engaged with EU funding programs. However, individual RRI keys are well embedded into the research practice in the country, and debates related to the RRI principles have steadily grown in prominence within the science and innova-

tion community in Bulgaria. This is apparent from deliberations on the social impact of scientific research, debates on ethics and institutionalization of ethical norms (ethics commissions, codes of conduct for research integrity), initiatives to promote open science and open access policies, and increased attention to different methods for societal engagement. The legal framework on RRI, however, lags behind leaving it to public research organizations and universities to elaborate their own internal regulations related to RRI principles.

Responsibility in research and innovation is interpreted by policy-makers and by the research funding institutions like the Ministry of Education and Science and the National Science Fund as a need to address societal challenges and provide solutions to pressing social needs. This would mean that funding priority should be given to those research-performing institutions which produce results useful to society. Responsibility is also associated with accountability and an open and honest dialogue between all stakeholders involved in the research and innovation system.

For ARC Fund as a research institute, responsibility is embedded in the principles of good governance, financial accountability, adherence to high ethical and professional standards, commitment to public accountability, openness and collaboration, efficient management of resources, operational and financial autonomy, equitable and transparent stakeholder engagement, and moral integrity.

### *Transforming Household Energy Consumption Culture and Raising Energy Consciousness of Consumers*

Climate change is becoming a critical issue, but the current pace and scale of change is not sufficient to achieve the necessary sustainability transitions in the energy systems

of European countries. In line with the European Commission' efforts to promote its climate and energy targets, ARC Fund played a major role in the extensive mapping of

sustainable energy consumption initiatives in European countries. ARC Fund surveyed and described several hundred community initiatives in 11 European countries through which households try to decrease their energy consumption and mitigate its negative impact on the environment.

Overall, ARC Fund and its partners have examined and classified 1067 sustainable energy consumption initiatives, creating an open access online **database** which informs users about their content, scale and objectives and assesses the attitudes to the challenge of excessive energy consumption. The database and interactive map are an invaluable resource for energy practitioners, researchers, community groups or anyone seeking good practice examples.

ARC Fund has also conducted a **study** of energy consumption tendencies, energy markets and energy policies in 11 European countries: Austria, Bulgaria, Cyprus, Estonia, Greece, Latvia, Lithuania, Poland, Romania, Spain, and Sweden.

The study on Bulgarian sustainable energy consumption initiatives revealed that 19 out of 45 examined initiatives attempt to change the energy consumption behavior of individual households or household members, while 14 projects aim at energy savings via various technological solutions. A few initiatives offer more complex solutions that necessitate the active involvement of a community of people who do not necessarily know each other, willing to (inter)act for the common good, rather than merely for pri-

vate energy saving purposes.

Most of the initiatives implemented in Bulgaria (32) are part of international projects, primarily funded by the EU. There are only a few grassroots projects, which shows an eagerness to participate in top-down initiatives, and a reluctance to self-organize and cooperate with neighbors and fellow citizens.

In 2018, ARC Fund, in partnership with an international team of energy experts, developed the ECO2 online training platform covering five thematic areas: limiting the carbon footprint of the house and its appliances; using and understanding ICT energy equipment; understanding energy language and energy bills; avoiding new energy consuming habits; and producing one's own energy. The platform raises consumers' awareness of their energy efficiency, so they could take steps towards improving it.

ARC Fund prepared a detailed overview of energy consumption and energy consciousness in Bulgaria based on previous studies in the field and on interviews with experts in energy efficiency and responsible energy consumption. An unpalatable conclusion of the report was that a great many Bulgarians seem indifferent or ignorant to the means and ways of saving energy at home. The report recommended organizing activities and trainings targeted at households and motivating them for responsible energy consumption. The ECO2 e-learning platform could be an efficient instrument in this regard.

### *Developing Research Infrastructures*

Insufficient capacity to evaluate research infrastructures (RI), monitor their operation, and assess their socio-economic impacts is a common problem for most countries in the Danube region, including Bulgaria. ARC Fund joined the regional partnership in an effort to strengthen the capacity of the regional RI policy-makers, RI managers and RI evaluators.

The major activity organized by ARC Fund in 2018 was the preparation, organization and implementation of trainings to build **capacity** for evaluation, planning, monitoring and management of research infrastructures. The three training events took place between February and May 2018 in Sofia, Banja Luka and Bucharest, and were attended by more than 100 policy-makers

from RI program owning and funding authorities, active RI operators and coordinators, and potential or active RI reviewers from 14 Danube region countries (Austria, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Germany, Hungary, Moldova, Montenegro, Romania, Serbia, Slovakia, Slovenia and Ukraine).

ARC Fund was also responsible for setting up a Registry of research infrastructure reviewers to be used primarily by ministries, financing authorities, agencies in charge of RIs, and research organizations planning RI investments. In September, 192 experts were approved for inclusion in the Registry.

The partnership developed guidance documents on ex-ante assessment, on monitoring, and on the assessment of the socio-economic impact of RIs, as well as recommendations for policy-makers and

for research infrastructure managers. ARC Fund moderated a working group on socio-economic impact assessment, and coordinated the preparation of the *Guidance Document for Assessment of the Socio-Economic Impacts of Research Infrastructures*.

ARC Fund was involved in mutual learning between research infrastructure managers from several countries in the Danube macro-region. The peer learning teams participated in two-day fieldwork, conducting interviews and attending the laboratories and other research infrastructure of the host institution in the respective partner country. Using the “critical friend approach”, the teams prepared specific recommendations to the host RI. ARC Fund experts were part of a team which visited the Faculty of Civil Engineering in Rijeka, Croatia.

### Building National Capacities for Project Management of Research and Innovation Projects

In 2018, ARC Fund performed an in-depth analysis of national capacities for research and innovation projects in the countries of the Danube macro-region, which focused

on the skills of project managers, on current abilities of organizations to carry out such projects, and on the availability of training opportunities in relevant knowledge areas. The



*The participants in the first training within the initiative Excellence-in-ReSTI, Eisenstadt, Austria, October 2018*

analysis revealed major differences, and a few similarities, between the countries in the region which are already members of the EU (with some internal differences still evident), and those which are associated countries. The surveyed practitioners throughout the region share the view that project management excellence is a double-layered concept with a significant impact on project success. On the one hand, excellence is seen as the high-quality scientific foundation of the project; on the other hand, it is an important trait of project outputs, which need to be timely, of high added value (i.e. of benefit to the public), and compliant to scientific standards. However, an issue common to all countries is the decoupling of scientific excellence from project management, with

either one or the other taking precedence in the working practices of both researchers and project managers.

To bridge this gap, ARC Fund contributed to the design of a comprehensive pilot course on the management of research and innovation projects. Based on its successful track record of involvement with such projects, the team developed a module offering a thorough overview of the rules and procedures for applying for EU funding through the major research and innovation programs – *Horizon 2020* and *Interreg Danube*. ARC Fund also facilitated the recruitment of Bulgarian trainees into the cohort of 25 individuals from the Danube macro-region who were trained and provided feedback about the pilot course.